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	Route to	See page
1		
2		
3		
4		
5		
6		

Contractors and Engineers Monthly

Vol. 46, No. 9 SEPTEMBER, 1949 $3 a Year, 50 Cents a Copy

Covering the Field

● Building Construction

Have you ever seen a jinniwick handle materials? If not, read the classroom-building story on this page.

As told on page 36, a soil compactor new in the U. S. treats fill which will support the flat-slab mat foundation of a one-story warehouse.

● Tunnel Bore Through Rock

Excavation for the City Tunnel section of Hultman Aqueduct in Boston was almost all through solid rock. See page 2.

● Bridges Built, Repaired

Two high bridges are a-building over stream gorges to carry U. S. 60 and 70 over Arizona mountains—page 5.

A 6,000-ton bascule bridge was jacked up 7½ feet in 5 days to correct an unusual settlement problem—page 62.

● Concrete Paving—Drainage Item

Feature item of the concrete-paving contract reported on page 11 was 6¾ miles of reinforced-concrete drainage pipe.

● Clark Hill Dam

Pictures and text on pages 18-19 tell the story of concrete production and placement for the $76,000,000 project now in high gear on the Savannah River.

● Bituminous Paving

On page 24 appears a typical Massachusetts black-top resurfacing story—setting, the town of Malden north of Boston.

● Highway Department Shop

Neatness, efficiency, and order are in command at the headquarters repair shop toured on page 25.

● New Airport in Grain Capital

Air-minded citizens of Salina, Kans., can now boast of an improved airport, thanks to the runway grading and paving job covered on page 28.

● Highway Appraisal

The highway picture, in brief, on page 33—its deficiencies and needs, the present rate of construction, the outlook.

● Tomorrow's Engineer

Will he still be the strong silent type in khaki, or will he be fitted for self-expression in a vital profession? Page 37.

● Pile Driving for Dock

Page 41 tells how some 1,203 precast-concrete piles were driven through sandstone to support a new concrete dock for the Port of Los Angeles.

● Rock Crushing for Road Base

A portable crusher processed lava-rock base material for a small but important betterment project in Idaho. See page 52.

● County Meeting, Demonstration

Modern low-cost paving machines and methods were recently demonstrated to county men. Page 76 tells what they saw.

● Highway Grading

Grades modified, curves flattened, new pavement on U. S. 89 in Utah—all of which means safer travel for the visitor to Bryce and Zion National Parks. Page 93.

(You will find "In This Issue" on page 4)

DRAINAGE PIPE INSTALLED ON ROAD PROJECT

C. & E. M. Photo

The concrete-paving job reported on page 11 called for 6¾ miles of reinforced-concrete drainage pipe. Here a Koehring crane lowers a 4½-ton section of 54-inch pipe into a 15 to 18-foot ditch. Cone Brothers Contracting Co. handled this contract.

Materials Handling Speeds University

New Building Goes Up Fast When Contractor Introduces Speedy New Handling Methods

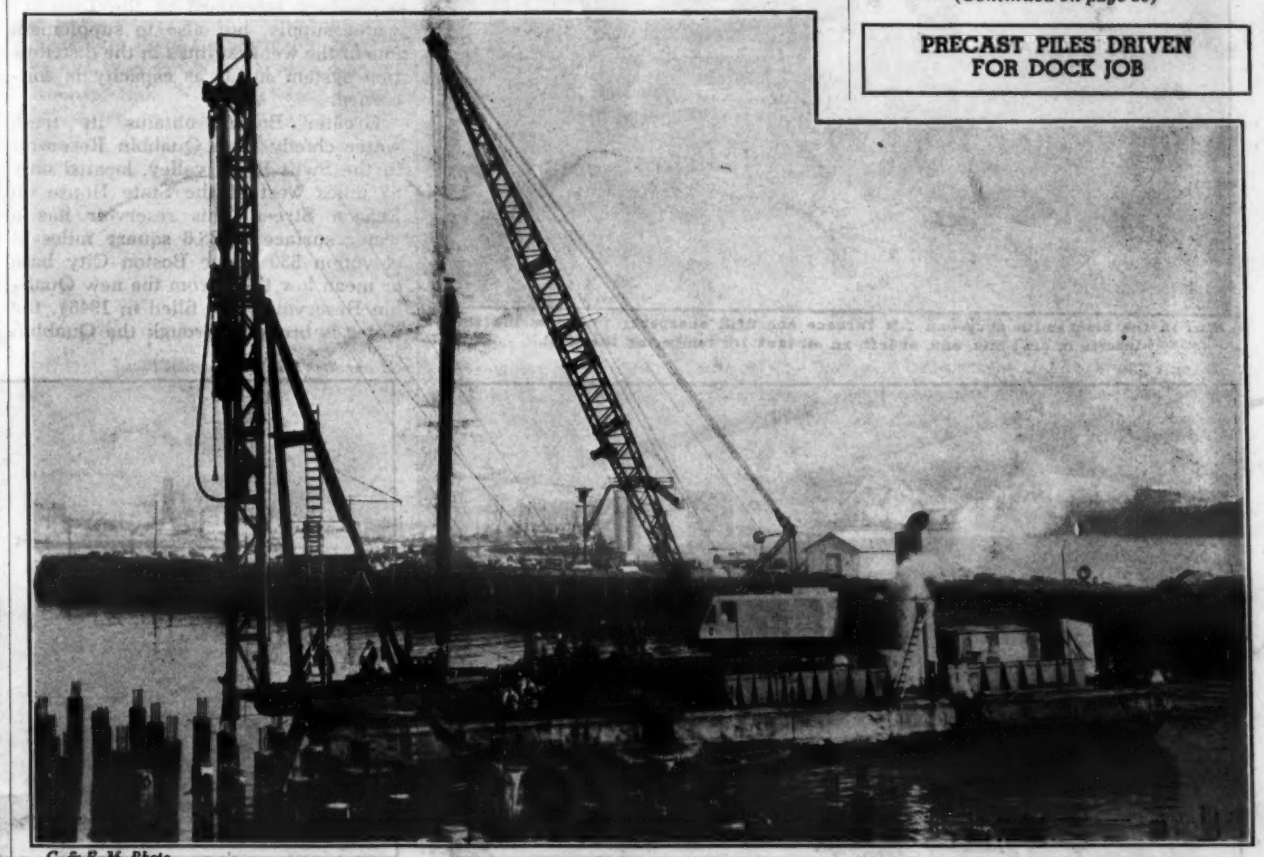
✦ YOU will have to go to Denver, Colo., to see a jinniwick. It's new. If you are a building contractor, interested in speeding construction of buildings through more efficient materials handling, the jinniwick will do it.

Three jinniwicks, coupled with monorail handling of concrete, tile, lumber, steel and other building materials, have drawn visitors from many phases of construction to a certain building at 15th Street and Cleveland Place in the heart of Denver. One construction superintendent who visited the job exclaimed, "All you need on that concrete bucket is a plush-covered seat for the operator!"

The new building on which the unique equipment and methods are being used is a classroom building four stories high for the University of Denver. Thomas Bate & Sons of Denver, Dallas, and Houston has the $900,000 contract for its construction. The University of Denver now owns the entire block adjacent to the construction site, and ultimate plans call for another building of the same type, joined to-

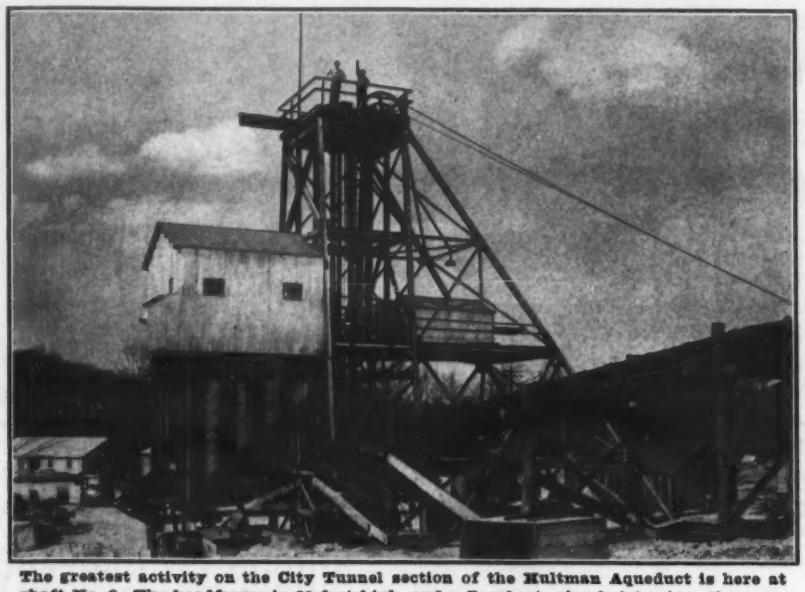
(Continued on page 80)

PRECAST PILES DRIVEN FOR DOCK JOB



C. & E. M. Photo

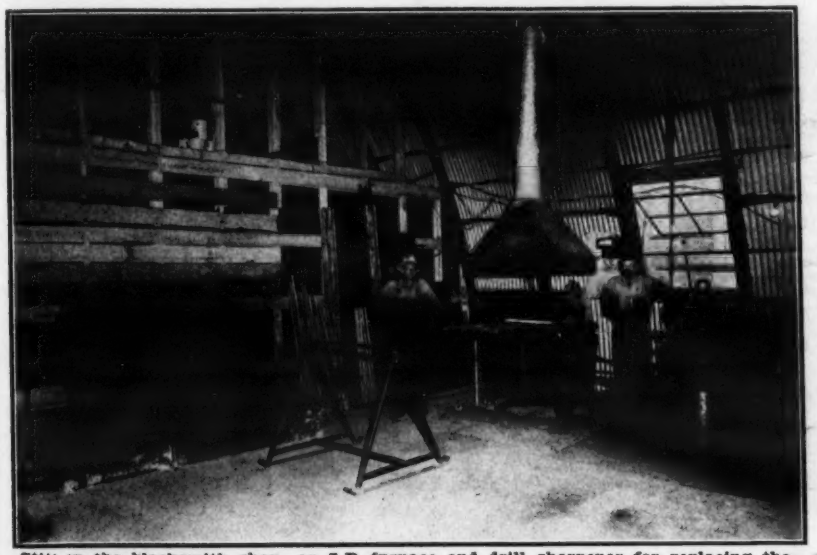
On a dock job for the Port of Los Angeles (see page 41), the James I. Barnes Construction Co. adopted an unusual procedure. It mounted this Link-Belt Speeder crane on the pile-driver barge to handle the heavy 6 and 8-ton precast-concrete piles.



The greatest activity on the City Tunnel section of the Hultman Aqueduct is here at shaft No. 6. The headframe is 60 feet high, and a Lambert mine hoist raises the cage.

Looking south from the headframe we see the G-E transformer bank, the compressor and blower house, and, in the background, the water cooler for the compressed air.

The largest shop on the site is a 41 x 80-foot Quonset hut. Shown here, an operator in the blacksmith section of the shop cuts drill steel on an Ingersoll-Rand cutter.



Still in the blacksmith shop—an I-R furnace and drill sharpener for replacing the inserts in drill bits, and, at left, an oil tank for tempering the steel.

Tunnel drilling was handled from this 30-foot-long jumbo made up of metal pipe supporting collapsible work platforms. It mounted seven I-R water-line drifter drills.

Water Tunnel Driven Through Solid Rock

Four Contractors in Joint Venture Bore 12-Foot-ID Aqueduct, 5.4 Miles Long, For Boston Water Supply

By WILLIAM H. QUIRK,
Eastern Editor

✦ THE 5.4-mile City Tunnel section of the Hultman Aqueduct, now under construction, is probably the most important of all the many contracts that are part of the major project of bringing additional fresh water to the metropolitan area of Boston, Mass. The work is under the direction of the Construction Division of the Metropolitan District Commission, an agent of the Commonwealth of Massachusetts. The Commission serves the Greater Boston area including the metropolis, as well as some 42 other municipalities within an approximate 15-mile radius of the Hub City. Twenty-three of these municipalities now take water from the district. This particular section of City Tunnel has been urgently needed, not only as a sanitary safeguard of the District's water supply, but also to supplement one of the weakest links in the distribution system so far as capacity is concerned.

Greater Boston obtains its fresh water chiefly from Quabbin Reservoir in the Swift River valley, located only 65 miles west of the State House on Beacon Street. This reservoir has a water surface of 38.6 square miles at elevation 530 above Boston City base or mean low tide. From the new Quabbin Reservoir (first filled in 1946), the water is brought through the Quabbin Aqueduct to the old Wachusett Reservoir with flow line at elevation 396.5. Wachusett Reservoir, approximately 25 miles east of Quabbin, was formerly the main source of water for the District. The Quabbin-Wachusett reservoir system is the source from which the metropolitan water system may be expanded to supply the needs of other areas or districts.

But the purity of this good water supply can be maintained only by transporting it through deep pressure aqueducts. Some of the old grade-line aqueducts carrying water from Wachusett passed through heavily populated and polluted areas. These original lines have now been replaced by the new Hultman pressure aqueduct which takes the water at the outlet chamber of Wachusett Aqueduct, and will ultimately deliver it to the District without exposure, except at the distributing reservoirs which equalize the rate of flow by taking care of the daily and weekly fluctuations in the consumption. The completed portion of the closed aqueduct extending to downtake shaft No. 5, at the Charles River south of Auburndale, is 18 miles long, and includes 3 miles of tunnel under the Sudbury Reservoir. This section of aqueduct, together with the sinking of shaft No. 5, was completed prior to the war.

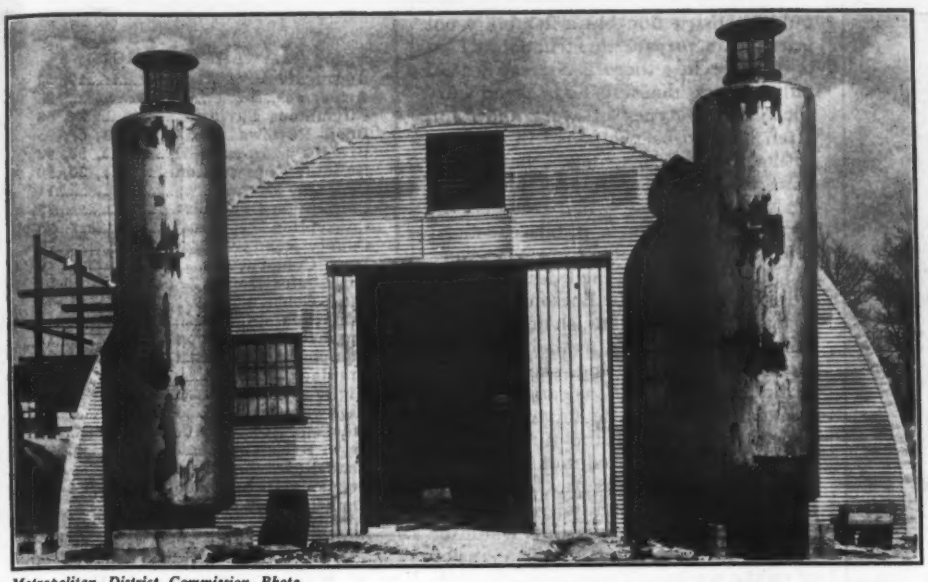
City Tunnel Section

The construction now under way, in the so-called City Tunnel section of the Hultman Aqueduct, begins at the bottom of the 357-foot-deep shaft No. 5 and runs easterly 5.4 miles to Chestnut Hill Reservoir. On this line are two

(*Continued on next page*)

Metropolitan District Commission Photos

This Conway Type 75 machine did the mucking. It is powered by a Kertner 75-hp induction motor off a 440-volt line. Each heading of the tunnel had its own mucker.



Metropolitan District Commission Photo
The compressor and blower hut houses two Chicago Pneumatic stationary compressors with a total capacity of 3,500 cfm, and a Root blower. Notice the silencers on the intake ends of the blowers.

Metropolitan District Commission Photo
The Root blower is a Size 7½, with a capacity of 44.8 cubic feet. It is operated by a Westinghouse 45-hp motor off a 2,200-volt line.

other shafts, No. 6 and No. 7, which were completed in 1947 under a previous contract. Shaft No. 6 is 290 feet deep, and lies 11,921 feet east of shaft No. 5. The bottom of shaft No. 5 is 162 feet lower than the bottom of shaft No. 6. Shaft No. 5 is a multiple-purpose 3-way shaft. At the bottom there will be a chamber for tunnel unwatering pumps discharging into the Charles River above. This underground pumping station can thus unwater, for inspection or for any emergency, not only the entire City Tunnel but also any future branch tunnel that may be constructed. One of the waterways in shaft No. 5 connects with a 300-foot spur tunnel in the direction of Watertown, for future use if found necessary.

When shaft No. 6 was sunk, 200 feet of tunnel was also dug in the direction of shaft No. 5, and 300 feet in the direction of shaft No. 7. This latter gave the tunnel contractor the opportunity to begin driving tunnel with the least possible delay. The same procedure was followed after shaft No. 7 was sunk to a depth of 240 feet. At this shaft, however, three spurs were started—a 200-foot tunnel towards shaft No. 6, a 300-foot tunnel towards shaft No. 7B, which is at the east end of the City Tunnel, and a 300-foot tunnel towards a proposed shaft No. 8. Shaft No. 8, if found necessary, will be located northeast of shaft No. 7 in the direction of Brighton.

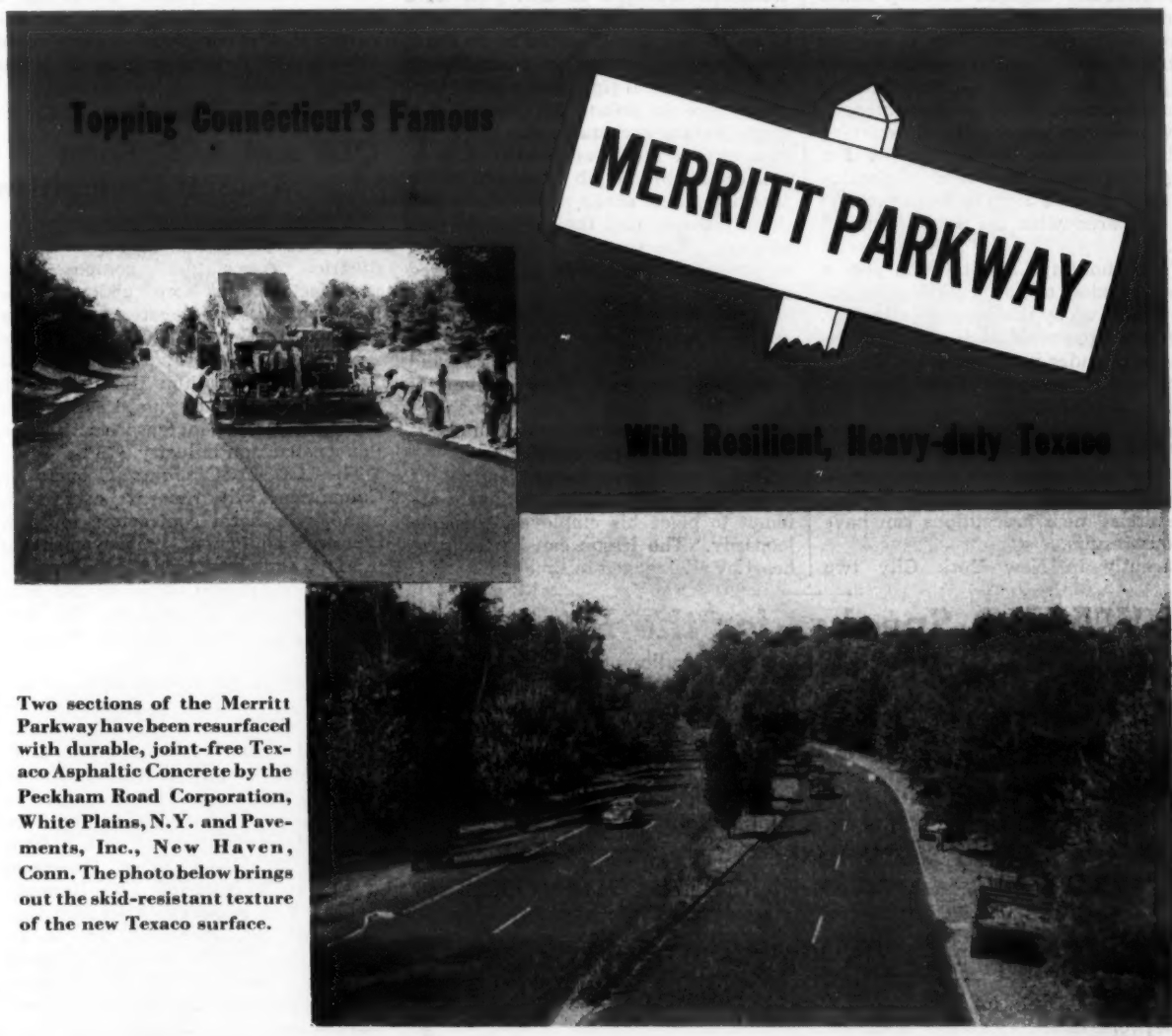
From shaft No. 6 to shaft No. 7 the distance is 13,342 feet, and from shaft No. 7 to shaft No. 7B it is 3,534 feet. Shaft No. 6 is about 50 feet lower than shaft No. 7, while the grade between shafts No. 7 and No. 7B is flat. Between shafts No. 5, 6, and 7, the tunnel has a 12-foot finished inside diameter, while from shaft No. 7 to No. 7B the tunnel is a 10-foot finished inside diameter. The spur for the proposed tunnel from shaft No. 7 to the future shaft No. 8 is also 10 feet finished inside diameter. All but 400 feet of the tunnel between shafts No. 7 and 7B is under water, since 7B is located on the east bank of the Chestnut Hill Reservoir. Shaft No. 7B is 220 feet deep.

Contract 115

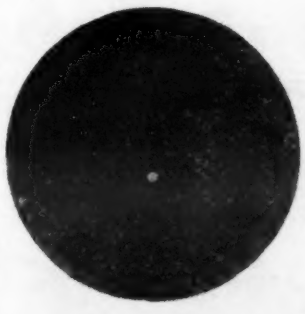
Contract 115 was awarded by the Metropolitan District Commission in October, 1947, to four contracting firms, associated in a joint venture, on their low bid of $9,529,867. The four contractors are: B. Perini & Sons, Inc., of Framingham, Mass.; C. J. Maney Co., Inc., of Somerville, Mass.; Walsh Construction Co., Inc., of New York City, N. Y.; and the Rugo Construction Co., Inc., of Boston, Mass. Work got under way on December 8, 1947, and the project is scheduled for completion in June, 1950.

The project consists of excavating

(*Continued on page 69*)



Two sections of the Merritt Parkway have been resurfaced with durable, joint-free Texaco Asphaltic Concrete by the Peckham Road Corporation, White Plains, N.Y. and Pavements, Inc., New Haven, Conn. The photo below brings out the skid-resistant texture of the new Texaco surface.



Most motorists driving north into New England travel over the Merritt Parkway, a toll road which crosses southern Connecticut. Traffic on Sundays in August averages 39,000 vehicles; Labor Day traffic has reached as high as 54,000.

This year, portions of the original pavement on the Parkway showed signs of disintegration. Connecticut handled the problem by the same economical, effective method which road builders throughout the country have employed for years. Using the existing concrete as a base, a resilient, heavy-duty Texaco Asphaltic Concrete surface of the hot-mix, hot-laid type has been constructed on approximately four miles of this heavily-traveled route.

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Contractors and Engineers Monthly

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For the Highway and Heavy-Construction Industry

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Shore for Safety

Contractors engaged in deep sewer construction should never, for safety's sake, forget the importance of shoring in trench excavation. What may appear to be firm, stable soil capable of holding to natural slope lines, or even steeper, may suddenly slide without warning and bury workers under tons of dirt. The extra money involved in shoring up the sides of a ditch or trench cannot be compared with the loss of human life.

Throughout the country this year a great backlog of sewer and pipe-line work, held up by the war, is under way. Everyone connected with such projects is usually under pressure to get the job completed as soon as possible, so that greatly needed facilities may be available for public use. But short cuts, such as working in deep, unshored trenches with steep side slopes, should be employed with great caution. Failure to exercise such precautions can have serious results.

Recently in New York City two workmen laying a 12-inch pipe were buried alive when the unshored walls of an 18-foot trench caved in on them. Emergency crews did not recover their dead bodies until eight hours later. Another case in point, but without the tragic ending, occurred a short time ago in a city of the Deep South. A contractor on a sewer job refused to let his superintendent shore a trench 20 feet deep, insisting that the soil would stay in place. The superintendent, refusing to put men in a trench he considered unsafe, resigned in protest. Work proceeded under a new superintendent and the pipe laying was completed. Scarcely, however, had the workers and city inspector quit that section of trench, when both of the earth sides collapsed. Serious injury or death was averted by only a matter of minutes.

That particular contractor learned his lesson, and will probably not again attempt to place his employees' lives in jeopardy. The lesson can be taken to heart by all engaged in similar work.

WASHO Speaks—for the Record

The annual meeting in Denver last June of the Western Association of State Highway Officials deserves praise for several reasons. First of all, its program was unusually full of today's real problems which confront highway engineers. More important than this, the majority of the sessions were open-forum or panel-type, with the delegates free to speak. Most important of all, the sessions were open to the press.

Westerners were willing to talk—for the record.

The western meeting illustrates vividly why the "bush league", as the WASHO is called, has pioneered much of the work of the "majors". Much of what the AASHO has done was conceived by the straight-talking engineers of the eleven western states and Texas.

This group throws its sessions wide open for all to hear, and it welcomes the dissemination of information by the press. It knows, *and it knows that the press knows,* what "off the record" means. It hesitates none at all to bring the most controversial subjects out on the table, where everyone can take a look and have his say.

In contrast, the deliberations of the Upper Mississippi Valley group never come to the attention of contractors, project engineers, and other people interested in highway work who look to the trade press for information they have every right to know. Yet the meetings of this and other regional groups are as important, or should be, as the annual WASHO affair.

WASHO is demonstrating excellent public relations at a time when that subject is high on every convention program. Other groups, particularly the Upper Mississippi Valley, could profit by the example of the westerners.

Larson Discusses Public Construction

A statement on public construction by Jess Larson, new Administrator of General Services, appeared in the July issue of "Public Construction". Mr. Larson commented on the vast amount of public works needed. While it is difficult to assess accurately the nation's needs in this field, he said, a total of $100,000,000,000 of new state and local public-works construction, as a 15-year program, is a rough measure of those needs.

He pointed out that the volume of new private construction increased from $3,800,000,000 in 1939 to $14,600,000,000 in 1948, an increase of 282 per cent; public construction increased during the same period from $2,500,000,000 to $4,200,000,000, up only 69 per cent. Public construction accounted for close to a third of the total new construction in the decades of the 1920's and 1930's; it was only 22 per cent in 1948.

Mr. Larson feels that public construction can become a most important instrument of national economic policy, and that it has an importance far greater than its percentage relationship to the national income would indicate. The direct material purchase and labor employment set up chain reactions for additional raw materials and secondary purchases and accompanying indirect employment.

The Administrator states further that public construction has a flexibility not inherent in private construction. That is to say, while there is a great deal of public work that must go ahead currently, some types of work may and often have to be postponed in times of active private construction because of material and man-power limitations. On the other hand, when private construction slows down, public construction can be accelerated to provide work for idle construction facilities.

In view of this, Mr. Larson advocates a large and adequate shelf of plans, fully blueprinted and available for immediate contract-letting, should public work be necessary as an economic stimulant at any particular time. He is not advocating that the public-works program be accelerated, but rather that definite planning measures be taken so that, if economic conditions should require it, completed blueprints would be at hand to permit immediate expansion of public works.

Such policy is not linked solely to a depression use. Because of the great backlog of needs, he says, communities should schedule public works on a most-needed, first-built basis. An adequate shelf of completed designs would allow a more orderly progression of this work.

CIA and AGC Form A Joint Committee

A joint cooperative committee has been formed by the Construction Industries Association, composed of manufacturers of construction equipment, supplies, and materials, and the Associated General Contractors of America. Its general purpose will be to provide a medium through which manufacturers and general contractors can cooperate to increase efficiency in the construction industry.

The CIA-AGC Joint Cooperative Committee will present suggestions made by general contractors for new types of equipment, improvement of present equipment, and progress towards more nearly complete and uniform repair-parts catalogs. Its first meeting was held in Chicago, September 15.

Members of the committee were announced as follows: Representing the CIA—W. B. Greene (Co-Chairman), President of Barber-Greene Co.; E. F. Armington, Vice President in Charge of Sales, Euclid Road Machinery Co.; J. T. Callaway, Assistant to the Vice President, The Goodyear Tire & Rubber Co.; C. R. Dodge, Vice President, Northwest Engineering Co.; Kenneth Lindsay, Vice President, Iowa Mfg. Co.; H. R. Meeker, President, The J. D. Adams Co.; H. T. Reishus, General Manager, Industrial Power Division, International Harvester Co.; J. R. Steelman, Vice President, Koehring Co.; and H. F. Hess (Co-Secretary), Executive Secretary of the CIA

Representing the AGC—G. C. Koss (Co-Chairman), Koss Construction Co.; C. E. Nelson, Carl E. Nelson Co.; L. M. Denton, Denton Construction Co.; D. W. Winkelman, D. W. Winkelman Co.; L. D. Wilbur, Morrison-Knudsen Co.; John MacLeod, Macco Corp.; A. L. Atherton, Atherton Construction Co.; F. L. Shackelford, Potter-Shackelford Construction Co.; and C. S. Embrey (Co-Secretary), National AGC staff.

This committee is the sixth such group to be established between the AGC and other associations and professional societies in the construction industry. The other cooperative joint committees are with the American Association of State Highway Officials, The American Institute of Architects, American Society of Civil Engineers, Associated Equipment Distributors, and the National Association of State Aviation Officials.

Absence of Escalation Lowers Building Costs

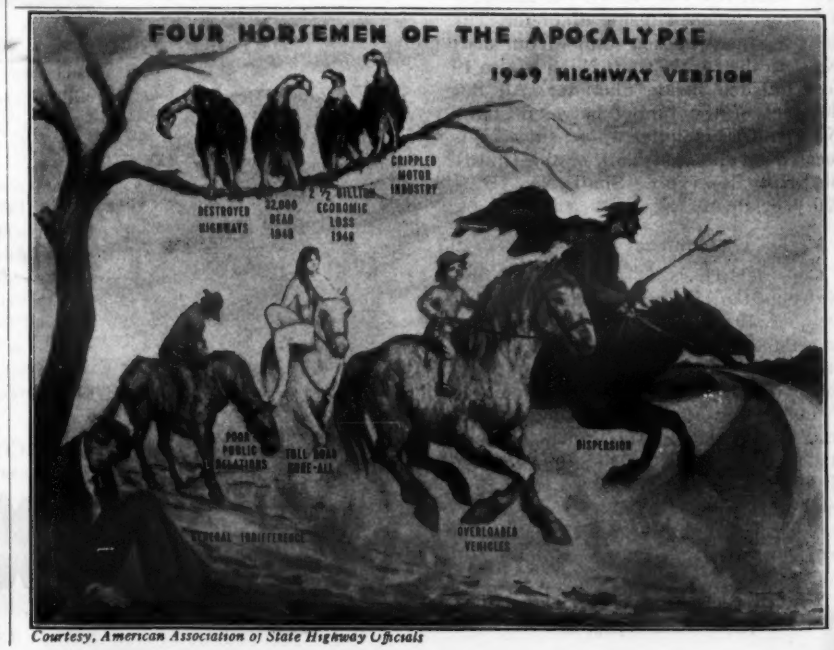
While the trend of building construction costs cannot be accurately forecast at present, the elimination of escalator clauses has been the biggest item in reducing costs, said H. C. Turner, Jr., President of the Turner Construction Co., in a recent statement.

As a result of stabilized material prices and labor rates, he said, suppliers and subcontractors are no longer including allowances for escalation or other contingencies in their bids. This in turn has allowed general contractors to do the same.

But Mr. Turner also feels that prices are down about as far as they will go. The subcontractors and general contractors, he says, are now quoting on a close profit-margin basis; no further reduction can be expected.

In This Issue

Aggregate Production	19, 52
Airports	28
Bituminous Paving	24, 68
Book Reviews	40, 50, 51, 67, 95
Bridges	5, 58, 62
Building Construction	1, 36, 90
Concrete Paving	11
Convention Calendar	75
Convention Report	76
County Road Work	76
Dam Construction	18
Distributor Doings	56-58
Dock Construction	41
Editorials	4
Engineers' Education	37
Equipment Care	25
Grading	28, 93
Highway Maintenance	25, 55
Highway Outlook	33
Index to New Products	98
Legal Decisions	91-92
Road-Base Construction	52
Roadside Development	48
Tunnel Construction	2



Courtesy, American Association of State Highway Officials

Two High Bridges Seal Gaps in Mountain Road

Superior-Globe Highway Improvement a Marvel Of Road Building as Men Risk Life on Bridges

By RAYMOND P. DAY,
Western Editor

✦ THEY are spending more than $1,000,000, risking lives, and using tons of high explosives to cross two puny mountain streams between Superior and Miami, Ariz. It is not a waste of money —or time. There is no more rugged road building in North America.

These two small streams—Queen Creek and Pinto Creek—intersect the only practicable route that has ever been found to carry U.S. 60 and 70 past towering Apache Leap, on up the sheer dacite walls of the gorge past Claypool Tunnel, and thence through spectacular high country toward Miami and Globe. The wide construction, straighter alignment, and longer sight distance of modern highways required a crossing of Queen Creek about 1 mile northeast of Superior near the present obsolete bridge. Pinto Creek had to be bridged in Gila County about 12 miles northeast of Superior.

Ever since 1940 the rumble of high explosives on new grading projects has been heard up and down the canyons. Some of the rock walls tower vertically for hundreds of feet. The near-by peaks have 3,000-foot elevation differentials from the gorge floor in a short distance. Cured through the ages by sparkling sunshine and bitter snows, the red rock is sometimes seamed with gray manganese, lighter limestone, or copper-bearing ores.

Through such country, men and equipment have forged link upon link of new construction. A few new grading jobs, the two bridges now under way, and construction of a new 1,100-foot tunnel 43 feet wide through the breath-taking dacite ridge high up over the Queen Creek gorge will make people want to travel the new highway. Even today, much of the old thrill is gone in driving between Superior and Globe. New alignments permitting traffic to whiz at 60 miles an hour through this mountain country replace steep grades and hairpin turns formerly posted for 15 miles per hour. The steepest grade is now 6.4 per cent.

In Phoenix, State Highway Engineer W. C. "Curly" Lefebvre explained some of the problems connected with the two bridges, in terms Arizona construction men understand.

"We don't have the kind of money these things cost," he said. "So we had to figure it close. By building both bridges as much alike as possible, we figured to save on labor, erection, and steel costs. To make sure, we let the contract with an alternate proposal to permit the contractor to bid on the steel work of both bridges. And sure enough, that alternate drew the low bid from Fisher Contracting Co. here in Phoenix.

"The parabolic steel arches for both bridges are identical," Lefebvre continued, "and both bridges have loading classifications of H-20 S-16, 1944. Both bridges are better than 650 feet long, with a central arch span of 350 feet; they rise 200 feet above the creek floors, and will stand for years to come. R. A. Hoffman, our Bridge Engineer, certainly did a nice job here."

Fisher Contracting Co. moved in to start work last October 20. Its contract called for approach spans, the steel arch and deck of the Queen Creek Viaduct, plus the steel arch work and deck of the Pinto Creek Bridge. The Pinto Creek approach spans and piers were finished under a separate contract with H. V. Hagen of Globe.

New Viaducts High and Dangerous

Construction of the steel work on both bridges will be dangerous because of height. Some of the lifts will also be heavy. For example, some system will have to be devised to reach out about 80 feet and lift 17 tons.

A description of Queen Creek Viaduct gives some idea of the project, because both projects are practically identical from a constructor's standpoint.

The parabolic steel arch which will reach across the deep canyon to support the bridge will have heavy steel members 97 inches deep. The ends of this arch will be fastened to anchor bolts

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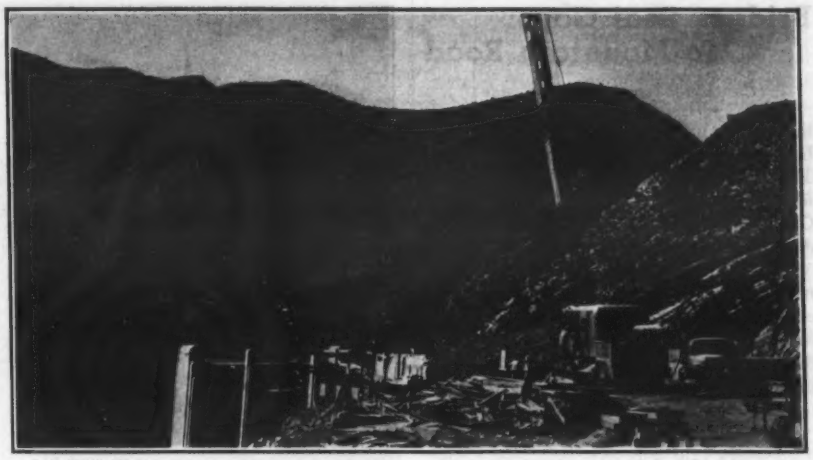

C. & E. M. Photo
Looking down across the top of the Queen Creek Viaduct from the north abutment, we see a Northwest crane handling a 27-inch steel girder.

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Bridges Seal Gaps In Mountain Road

(*Continued from preceding page*)

buried in huge concrete blocks at the base of the skewback bents, or piers. The parabolic arch for both bridges is identical in every respect. On the Queen Creek structure the anchor pins are at elevation 3,049.00.

Steel columns rising off this arch will in turn support the steel girders and reinforced concrete of the deck. Thirty feet of deck width will permit two wide, heavy trucks—such as presently use the highway—to meet and pass with ease on the structure.

On the north wall of the canyon, three high piers and a heavy concrete abutment poured in solid rock will carry the approach spans at that end. The south approach span consists of one high pier and a concrete abutment.

The Queen Creek structure has a tangent section at the south end, which blends into a 6-degree curve toward the north end to carry traffic around the long, sweeping bend toward the future location of the tunnel. The bridge deck also rises from south to north on a slope of 6.368 per cent. Deck slopes and curvature of the bridge have, of course, made its construction somewhat more complicated than usual, considering the rugged terrain in Queen Creek canyon.

Directly underneath the initial location of the south abutment, location engineers found a huge cave hollowed out in limestone rock deep underground. Some of the rooms were 40 feet across. Hesitating to set a bridge abutment over this large a cave, engineers moved the abutment over to the west, causing part of the subsequent curvature in the deck. A heavy grading job tying in to the south abutment was also swung a little to blend it in with the structure.

Hugging the red rock walls of Queen Creek gorge near Superior, Ariz., a Northwest crane (below) picks up a piece of steel and starts it to the top of the viaduct under construction where riggers guide it into place (right, above). Underneath the viaduct the old road is visible.

The arch span of Queen Creek Viaduct, measured parallel to the chord, is 350 feet. The distance from main pier to main pier is 380 feet 9 inches. The length of the bridge deck overall will be 651 feet.

Steel-Erection Scheme

Steel erection had not progressed too far when CONTRACTORS AND ENGINEERS MONTHLY visited the project, but the nucleus of a daring plan had been evolved for steel erection. Allison Steel Mfg. Co. of Phoenix had been given a subcontract to fabricate and erect the structural work for both bridges. It is one of the larger jobs ever attempted by Arizona steel firms.

Allison Steel plans first of all to erect the 27-inch steel deck girders and tie in the steel diaphragms which separate them. The deck can then be built to the main piers, and men with equipment can work out that far.

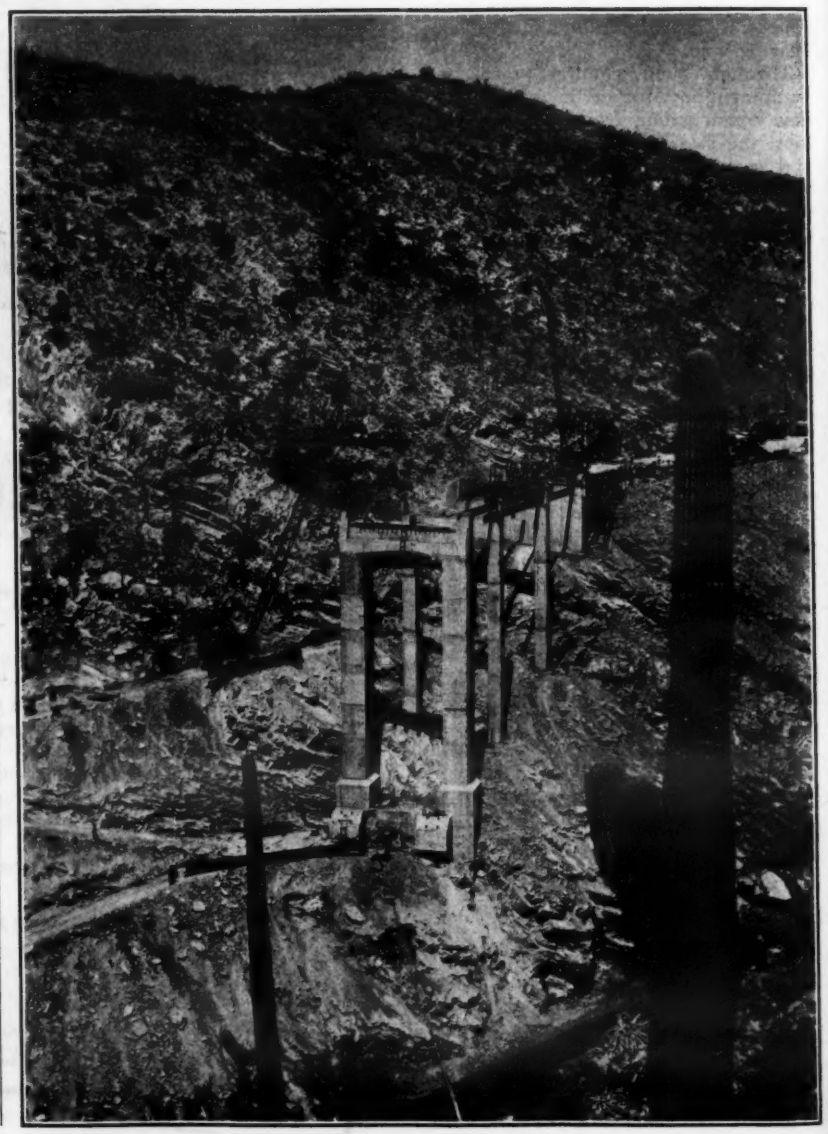
It is 350 feet between those high piers: all of it over the creek gorges. At Queen Creek the present roadway, with its traffic, winds *under* the work. Traffic will have to go through the job.

Allison Steel proposes to use a large crawler crane, a Northwest 80 owned by Fisher Contracting Co., from the north deck. A similar large crane will begin work from the south. The heavy pieces for the arch will start in. Forty feet out from the pier, a special erection tower will then be installed. It will rest on a heavy concrete pedestal, and at its top side there will be thick steel plates to

(*Continued on next page*)

C. & E. M. Photos

In the photo below, the whole project is framed by Arizona's state flower—the saguaro cactus. The viaduct stretches some 650 feet and rises 200 feet above the creek floor. Fisher Contracting Co. of Phoenix is handling the approach spans and the steel arch and deck construction.



catch and support the arch out to that point.

When this tower is in, the heavy crane can then crawl out to that point and erect more steel. Ninety feet beyond the main pier a second steel tower will be placed. This one will have a heavy hydraulic jack on top. The arch can be fabricated then out to that point. These erection towers have been duplicated so that work can proceed from both abutments.

When construction reaches a point over the last erection towers, however, the steel erectors are "on their own", in field parlance. Between those slim towers will lie 170 long feet which will have to be bridged—and the distance down will be greater than the distance across. Cranes will not be able to crawl out very far, if at all, beyond the last erection tower.

The final scheme as to how the 17-ton piece in the center can be raised and handled has not been settled at this writing. It may be that sufficiently large crawler cranes can do it. It may be that a revolving crane will have to be erected. Or perhaps a high line. It is expected that details on this hair-raising work in the center of the bridges can be reported in a later issue of this magazine.

Other Parts Tough, Too

Other parts of the job were hard, too. The men of the Fisher Contracting Co. organization who scaled the canyon walls drilling and blasting the rock foundations can attest to that. Men who set concrete forms high above the ground, and others who tried to hold them in place during the pours, know that it was never easy.

The job has had its hair-raising moments. Like the day one of the carpenters lost his footing and plunged headfirst toward the rocks, 80 feet below. His buddy grabbed him by the leg as he hurtled past, dragging him in on the platform from where he was working. It was close. Too close. But the man whose life was saved didn't even get a scratch.

Rock Excavation

Of 1,800 cubic yards of structural excavation, practically 100 per cent was rock. It all had to be drilled, shot, and then clammed out, sometimes under "blind" digging conditions.

Two compressors, a Gardner-Denver 500-cfm and a Le Roi 105-cfm machine, saw service, with perhaps a dozen pneumatic drills, mostly Thors. Timken steel with Timken detachable rock bits were used throughout the job. Maximum length of steel was 20 feet, and C. B. Browning, the Resident Engineer, permitted drilling to within 2 feet of grade.

The rock was exceptionally tough, and in some of the manganese seams it was almost impossible to drill. Some of these small manganese pockets took days to drill. A bit dulled in 3 inches, where 10 feet over, in dacite or limestone, it might go 3 to 4 feet without being ruined. The grading contractor just south of the bridge was ruining $30 tungsten-carbide bits in 2 feet—to give an example of how tough it was.

Holes at the top level of excavation were placed up to 5 feet apart, but as the rock pocket progressed toward the bottom of excavation, the hole centers were narrowed down. The final shot on some of the foundations was made with hole centers only 12 inches across. The shots were all made with 40 per cent Apache stick gelatin, detonated by electric blasting caps. Good fragmentation was a prime requirement here, and since the surrounding rock was all hard and tough, the holes could be loaded heavily to do the work.

Many times the drillers had to work on safety lines on the cliffs, and as they gouged out the holes, the footing became safer.

A Link-Belt crane with a 70-foot boom, mounted on a Maxi frame, was used with a ⅜-yard clamshell bucket to muck out the south pier and abutment. Perched high up on a knob, this machine had to work "blind" because its operator could not see the location far below in which his bucket was working. One man gave the signals. The clam bucket made many a trip out of the hole with only three or four small rocks, but it also made its share of loaded trips as

(*Concluded on next page*)

C. & E. M. Photo

The camera points west from a high point on the old road to show the rugged Arizona site for the Queen Creek Viaduct job. The big steel reservoir in the foreground is Superior's water supply.

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Bridges Seal Gaps In Mountain Road

(Continued from preceding page)

well. The broken rock was dumped off to one side and allowed to roll down in the bottom of Queen Creek, where it could be loaded out later by a power shovel.

On the north side, a Northwest 80 machine was used, with a 1½-yard clamshell bucket on a 100-foot boom. The main skewback pier footing was excavated, after being blasted, with the machine working down on the old road. The others were mucked out with the machine on a higher level, working from a pioneer road which had also been built up the north wall. This road work involved almost as much drilling and shooting as the pier excavations, because the road consists of about 400 feet on an 18 per cent rise, then 150 feet of switchback on a 13 per cent rise, and a switchback and a working platform beyond that.

This road was vital later on to concrete forming, placing, and steel work.

Concrete Work

Concrete form work on the abutments and piers called for architectural standards of strength and excellence. The large main piers measured 8 feet 6 inches x 12 feet, and were of hollow construction. Walls were 18 inches and 24 inches thick. The smaller piers were solid reinforced concrete, 5 feet 3 inches x 4 feet. In all cases the slim, tapered pier legs were capped by a reinforced-concrete arch. The shoring to support this concrete from underneath was very heavy.

For the small piers, the shoring consisted of 6 x 8-inch timbers placed so thick "they resembled a forest", as one carpenter expressed it. The massive 450-ton cap over the main piers was supported by three 24-inch steel I-beams, laid 18 inches into slots in the piers.

Carl Jacobson, Fisher's General Superintendent, said, "It was certainly a relief when those two pier legs were joined and the concrete set up!"

Concrete forms were generally prefabricated in a carpenter yard on the job. After the panels were finished, they were trucked out to the job and erected by the Northwest crane. After the piers left their foundations, the pours were made generally in lifts 25 feet high. One 33-foot lift was made.

To hold the weight of concrete in these high lifts, 4 x 4 studs were used on 8-inch centers, and ¾-inch plywood was then nailed to the studs. Heavy wales were often used to catch steel form bolts. Two sets of form bolts were used each way, and in addition, Symons patented form clamps were also used. The pier forms were lined each way with the cross hair of a transit, and taut cables leading each way from the forms held them on line during the pours.

Deck forms will consist of Universal steel panels. They will rest on a series of 4 x 8-inch deck joists at 3-foot centers. The ends of the 4 x 8's will be supported by 2 x 4-inch risers, resting on the flat flange of the deck girder members.

Concrete batching equipment consists of a Johnson Size 3000 weigh batcher, three Rex Moto-Mixers, and a Wagner Scoopmobile to keep the weigh batcher charged. Superior Sand & Gravel Co. of Phoenix furnishes sand and rock, which is trucked about 55 miles from Phoenix out to the job. Colton bulk cement is being used, and the concrete mix incorporates about 4 per cent of air entrainment.

The concrete batches were weighed out, water was added to the Moto-Mixers from a reservoir near the batch plant, and the truck-mixers then hauled the material out to the job, where mixing was completed and the concrete placed.

The main pier footing, involving a heavy pour, was placed from the old road below. The Northwest machine handled a 1½-cubic-yard Gar-Bro concrete transfer bucket between the Moto-Mixers and the pour. Foundations for the other piers were all placed with the crane on the top switchback level. The Moto-Mixers were backed up the 18 per cent access grade to the end of that road.

The concrete was thoroughly vibrated by Mall electric machines in order to get faces which would strip out well. After placing, the concrete was dampened with water to keep it wet. Surfaces on the approach decks were cured by Hunt Process concrete-curing solution.

The supports under the pier tops were left in place 21 days until the concrete developed great strength, which usually averaged about 2,750 pounds at 14 days.

Fine Instruments Used

Both viaduct projects are somewhat unusual because of the excellence of control surveys, and the instruments which are being used. The master survey network in the canyon has been run with Wild surveying instruments, and the Wild gun will work accurately to within one-half second.

Other Wild instruments are being used at the Queen Creek bridge to lay out and control the 6-degree curve of the deck, the superelevated deck section, and other intricacies of the work. It was particularly noteworthy to see that girders on the north approach—and that is the tough end—were set in place quite accurately over the anchor bolts. The holes which were fitting so perfectly are drilled, not slotted.

Surveymen hang on to the sides of the rock canyon. They set instruments up and operate them in places deer fear to go. They scale piers and coon out over the steel to take their readings. And the carpenters have absolute faith on this job in the points they set. Together, they are building two bridges which will endure for many years.

Good Roads Product Show

State, county, and city highway and street officials, contractors, equipment dealers, etc., are invited to visit the Good Roads Machinery Corp. factory at Minerva, Ohio, and to inspect the "Products Parade" now on exhibition. The show is expected to remain open until the middle of November. The plant is located right on U.S. 30.

Open for public inspection are approximately 32,000 square feet of display space containing all types and models of the company's snow-removal and sleet and ice-control equipment, as well as many other items for road maintenance work. In addition, there are several acres of proving ground and demonstration area.

WHY "CATERPILLAR" S

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Take a good look at your present scraper equipment. Sure, the machines are holding together. They're moving earth. But *can you afford* to keep them on the job, when competitors are using "Caterpillar" Scrapers—moving more yardage, faster, at lower costs?

On these pages are a few of the reasons why the "Caterpillar" Scraper is out ahead in profitable operation. Let your "Caterpillar" dealer show you other superior features. Then talk to him about trading in your old "pans" on the new machines he can supply.

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"Caterpillar" design, with positive ejection and high apron lift, gives you fast, clean dumping and smooth spreading on the fill.

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ENGINES
TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

Here's a good example of the way "Caterpillar" bowl action funnels the material upward to make a heaped load faster, more easily.

Equipment Cost Manual Is Revised by the AGC

The Associated General Contractors of America, Inc., has published in revised form "The Contractors' Equipment Ownership Expense Manual". There are two principal changes in the revised edition. First, nearly 1,400 items of equipment have been added to those carried in previous editions. Tentative percentages have been used for these items in view of insufficient experience with them. Second, sample costs in dollars for the various items listed are omitted. In the present volume, space is left for the contractor to insert the actual price paid for each machine or piece of equipment to which the percentages apply.

The AGC points out that this second change is in line with the fact that the manual is a compilation of data on average costs to general contractors owning and operating various types of equipment. It is not, and never was intended to be, the AGC emphasizes, a rental schedule.

Copies of the new edition are available from the Construction Foundation, 1227 Munsey Building, Washington 4, D. C. Prices: $1 a single copy; $10 for 12 copies; $65 for 100 copies.

Equipment Lubrication

A 28-page service handbook on Lubriplate lubricants has been issued by the Lubriplate Division of Fiske Brothers Refining Co., 129 Lockwood St., Newark 5, N. J. The catalog describes the development of Lubriplate, the laboratory control standards maintained in its manufacture, its features, and its applications.

Four series of Lubriplate lubricants are available, covering both fluid and grease types, in addition to some miscellaneous products. There are a number of products within each series, varying in properties and characteristics. Included in the booklet are recommendations for proper lubricants for bearings, gears, chains, cams, slides, and taglines.

Two 4-page news-like folders on the use of lubricants in the construction industry are also available. On-the-job photographs illustrate the bulletins, while tables suggest product uses for various equipment.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 103.

New Browning Sales Head

John R. Cary has been appointed Sales Manager to succeed William H. Waite, who is retiring after many years of service with the Browning Crane & Shovel Co., Cleveland, Ohio.

R" SCRAPERS

er costs per yard

The "Caterpillar" Scraper blade is designed for *slicing* action in the cut. It digs faster, with less drawbar pull. And the apron is so designed that it won't clog the loading chute. It allows the material to *funnel* up from the blade without excessive packing.

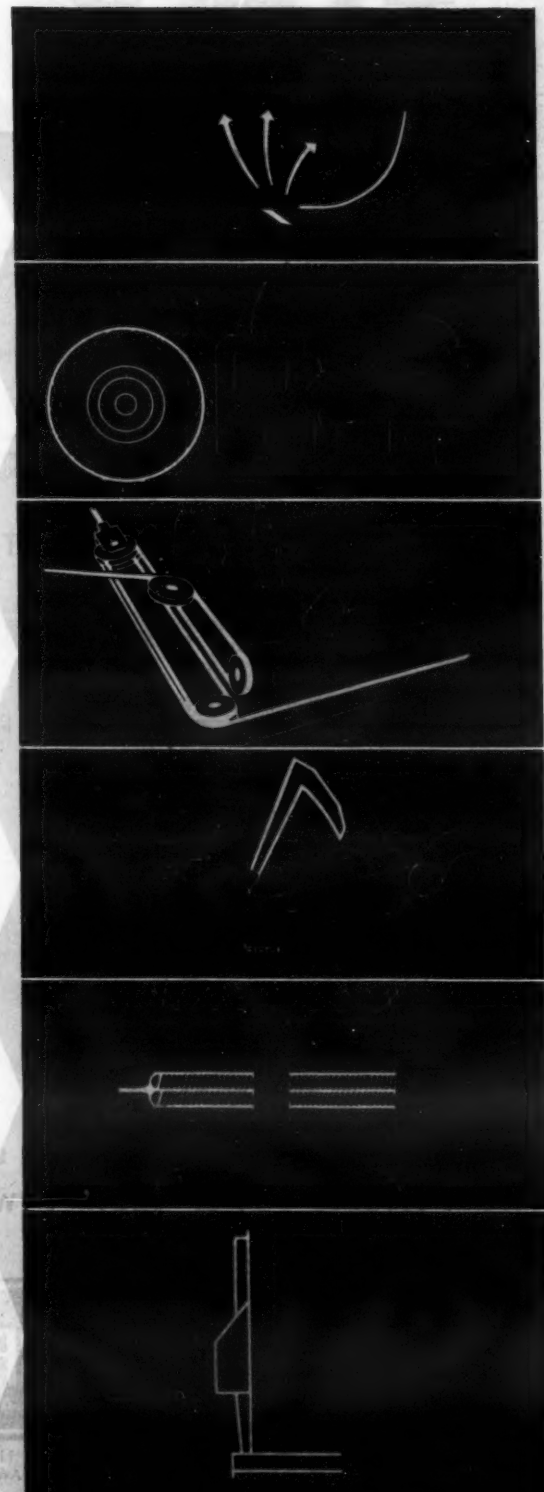
Bigger tires on the "Caterpillar" Scraper give low rolling resistance on the haul. That means higher travel speeds and more trips per day. Big tires also allow very low tire pressures for greater flotation in soft earth. You can operate in working conditions that would bog down the average scraper.

On the fill, the "Caterpillar" Cable Control system takes over to eject the material in smooth layers. Concealed sheaves and cable keep out abrasive material and result in longer cable life. Yet all cables can be replaced by a man standing on the ground. Sheaves are accurately aligned, heat-treated and machined, so that cable doesn't chafe or wear.

The apron lifts high, with no interference overhead. It is pivoted on the outside and well back on the bowl for ample load clearance when spreading material.

Four long flexible springs are hooked directly to the ejector plate to give a simple but dependable return action after a load is spread. Springs and ejector sheave systems are both well shielded from abrasive earth.

"Caterpillar" Scrapers are built to true "Caterpillar" quality standards. Box section double bottom and box section side walls, made from special high-tensile steels, are among the reasons why these units have exceptionally long work life.



Mobile Radio Units In 25 to 50-Meg Band

New 25 to 50-megacycle mobile radio communication equipment which meets all new FCC regulations has been announced by the General Electric Co. It is designed for use by highway maintenance departments, the heavy-construction industry, and others in land-mobile radio service.

This equipment is available for 20 or 40-kc channel widths, the narrow-band units making 40-kc adjacent channel operation a practical possibility in the same service area. The complete line includes 50 and 250-watt station combinations, 30 and 50-watt mobile units, remote-control consoles, antenna equipment, and accessory items.

A special trial offer is being made by the company, to demonstrate the new G-E equipment to users of two-way communication systems. A station receiver will be installed in any existing system on a "satisfaction or money-back" basis.

Further information may be secured from the Radio Communications Section, Transmitter Division, General Electric Co., Electronics Park, Syracuse, N. Y. Or use the Request Card at page 16. Circle No. 113.

Surveying Altimeter

The American Paulin System, 1847 S. Flower St., Los Angeles, Calif., announces its first Micro-Altimeter. Graduated in intervals of 1 foot over a range of 6,000 feet, this instrument is said to be accurate to 1 foot and sensitive to altitude changes in inches.

The manufacturer says that geologists, surveyors, and field engineers can run surveys with this 4½-pound altimeter in a portion of the time consumed in ordinary surveys, and with a high degree of accuracy and dependability.

Model M-1 is the first of the new Micro series available. It will shortly be supplemented by Model M-5 with a range of 15,000 feet graduated in intervals of 5 feet, and by Model MM-1 with a range of 5,000 meters graduated in intervals of 1 meter.

Each model comes in a rugged leather carrying case with hand and shoulder straps. Included with each instrument is a magnifier, thermometer, and instructions for full operational procedure.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 129.

Protective Coatings

A 4-page folder entitled "Perma-Skin Vinyl Corrosion-Resistant Protective Coatings" has been issued by Dennis Chemical Co., 2701 Papin St., St. Louis 3, Mo. This catalog explains the use of Perma-Skin for resisting the deterioration of metal, wood, stone, brick, and concrete by atmospheric and chemical action. The Perma-Skin system, it states, is applicable to structures and equipment.

The bulletin lists the characteristics of the product, points out that it is applied with a spray gun or brush, and explains that no heating or baking is required since Perma-Skin dries by evaporation of the solvent.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 21.

Link-Belt Official Dies

Edward J. Burnell, Vice President and General Sales Manager, and Director, of Link-Belt Co., died at his home in Winnetka, Ill., last July, after an illness of several months. He was born in Tondu, Wales, Great Britain, April 7, 1888.

Mr. Burnell served Link-Belt Co. in many important capacities, in engineering, sales, and plant management.

This small crawler tractor, the Agricat, is especially designed for leveling and backfill work. It hugs the ground for sidehill and terrace work.

New Small Tractor Has Crawler Tracks

A small tractor that operates like a big tracklayer is now being manufactured for Earl H. Pence & Co., Inc., 2810 Derby St., Berkeley 5, Calif. The Agricat, as it is called, is 38 inches wide, 58 inches long, and 41 inches high. Powered by a 6-hp air-cooled Wisconsin gasoline engine, it is suitable for a variety of jobs including leveling, backfilling, plowing, and scarifying.

The tracks are 6 inches wide, and the total track area on the ground is 318 square inches. The Agricat hugs the ground for sidehill and terrace work; the operator sits only 29 inches above the ground. The unit has two forward speeds and one reverse speed. A number of small tractor tools may be obtained for use with it.

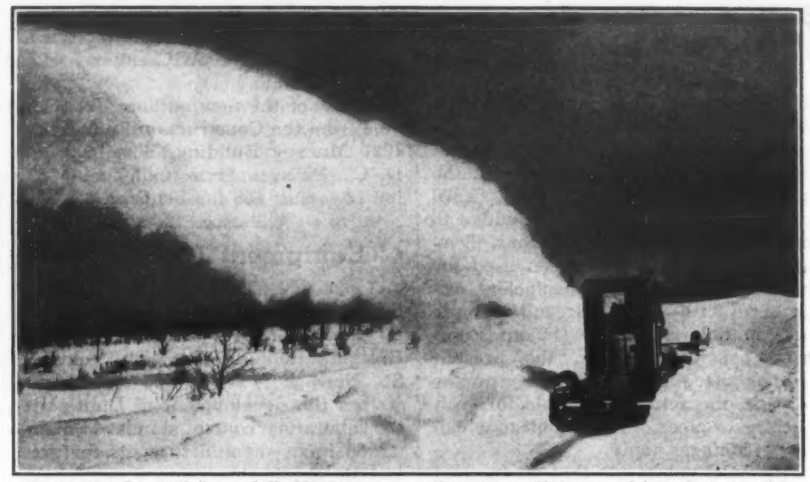
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 37.

Rotary Snow Plow, Grader Attachment

A new contract establishes the Austin-Western Co. of Aurora, Ill., as sole distributor of the Sicard Snow Master rotary plow when used as a grader attachment.

The company states that completely controlled casting is achieved in the Snow Master through its patented revolving telescopic chute. Snow can be cast in a full 220-degree arc through a distance of 150 feet. Blower housing and wrist-action chute combined enable the operator to cast to the exact spot desired.

This rotary snow plow can now be backed by the power and control of four-wheel drive. Austin-Western power graders, featuring all-wheel drive and all-wheel steer, precision side shift, and controlled traction, can be converted in a few hours from their normal grading operations for use with the Sicard Snow Master.



Snow can be cast in a full 220-degree arc through a distance of 150 feet by this Sicard Snow Master mounted on an Austin-Western power grader.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 151.

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EFFICIENT — This fluid will positively start heavy duty engines in coldest weather with engine in normal operating condition. Will produce starts in 10 seconds at 30° below zero.

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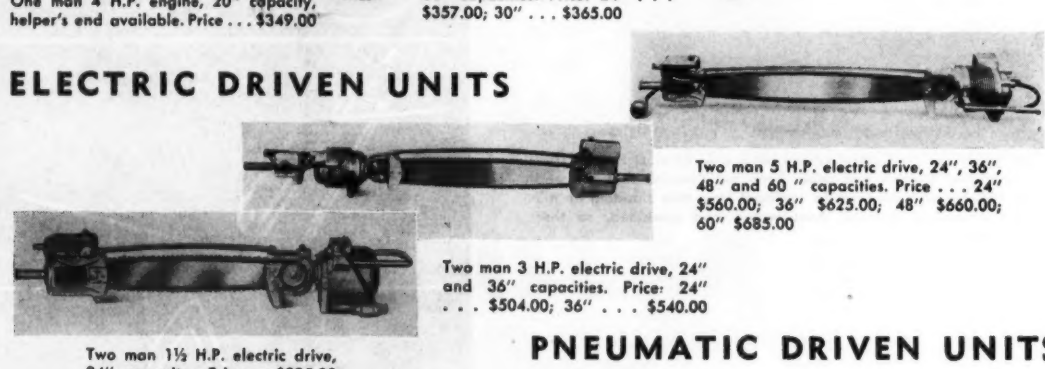

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Two man 3 H.P. electric drive, 24" and 36" capacities. Price: 24" . . . $504.00; 36" . . . $540.00

Two man 1½ H.P. electric drive, 24" capacity. Price . . . $385.00

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Two man 5 H.P. pneumatic drive, 24" and 36" capacities. Price . . . 24" $548.00; 36" $583.00

Two man 3½ H.P. pneumatic drive, 24" capacity. Price . . . $345.00

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Good Progress Made On Concrete Highway

Three-Mile Four-Lane Job Out of Tampa Built by Two Contractors: 6 3/4 Miles of Pipe Needed for Drainage

(*Photo on page 1*)

✦ THE State Road Department of Florida has effected a major improvement in the west-coast Tampa area with the reconstruction of a 3-mile section of U. S. 41, or State Route 600, from a 20-foot pavement into a superhighway with an 84-foot roadway between curbs. The new cross section includes two 22-foot concrete pavements on either side of a 4-foot center strip, with a 16½-foot lane of lime-rock base topped with asphaltic concrete flanking the concrete along the sides. The standard concrete curb-and-gutter section adds another 1½ feet on each side. Beyond the curbs are 7½-foot concrete sidewalks mostly 4 inches thick, with some areas increased to 6 inches. Now buried in the sand, but an important item in the highway contract, are 6¾ miles of reinforced-concrete drainage pipe from 15-inch to 54-inch in size.

The project was awarded by the Road Department to two Tampa contractors, Brinson Construction Co. and Cone Brothers Contracting Co., on their joint bid of $1,325,759. They arranged the division of work between themselves. Brinson Construction Co. took the greater portion which included grading, paving, and sewer work within the 100-foot right-of-way. Cone Brothers Contracting Co. looked after the sewer installation beyond the right-of-way lines.

Work started on December 21, 1948, and by mid-April, 1949, half the concrete pavement was laid. By the middle of May the rest of the concrete paving was expected to be completed, while the lime-rock base sections were scheduled for completion in June. The pouring of the center strip followed, along with the slower curb-and-gutter work. The entire project will most likely be finished before November 1, well in advance of the time allotted for its completion.

Widen Right-of-Way

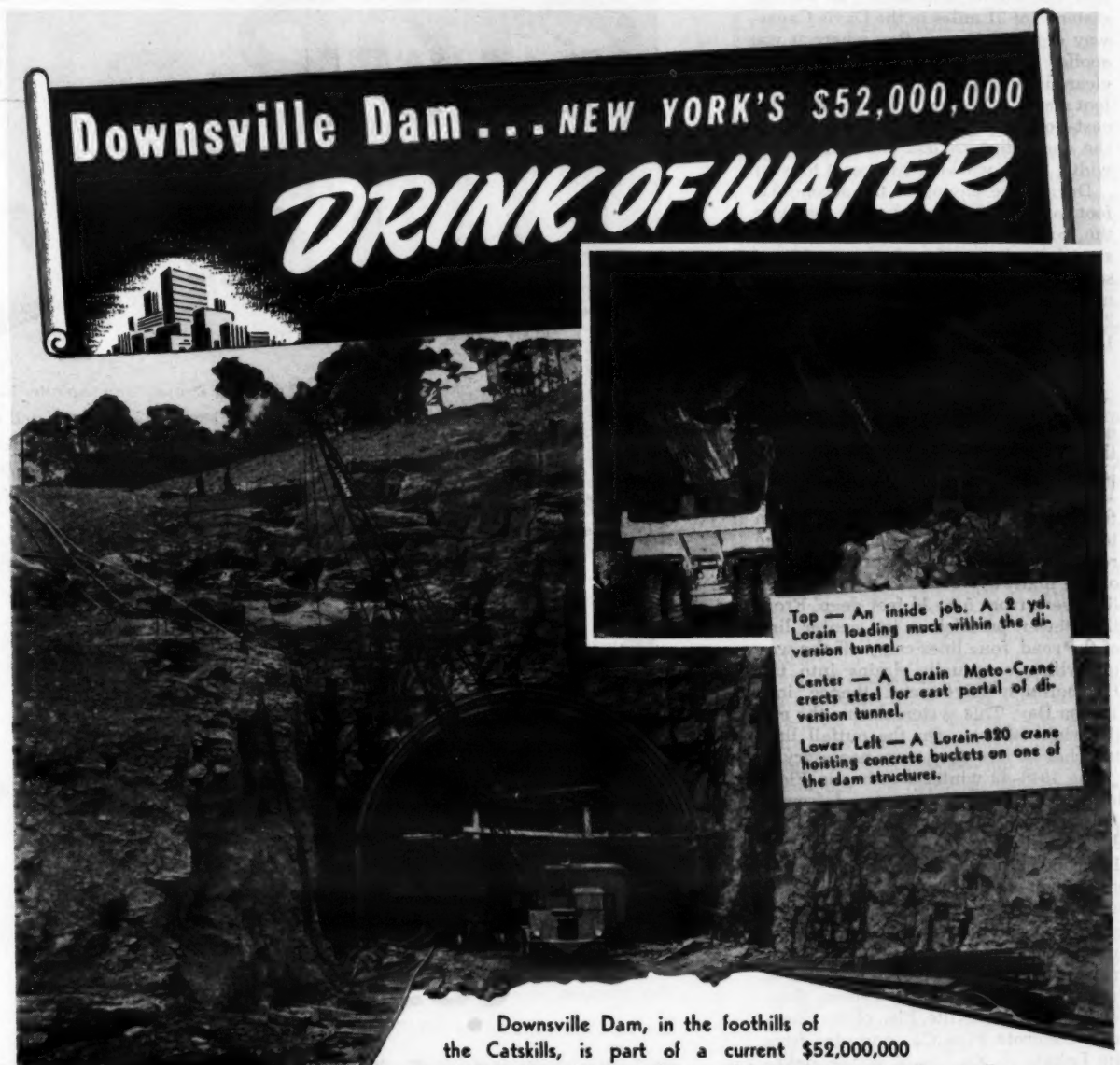
Back in 1929-30 this road was paved with a 9-6-6-9-inch plain-concrete section 20 feet wide, with the center 14 feet being 6 inches thick, and the outer 3 feet increased to 9 inches. At that time the right-of-way was 66 feet wide. In preparation for this reconstruction the right-of-way was widened to 100 feet, necessitating the moving of many gasoline stations and homes that lined the road. This work was done by Hillsborough County in which all but the western half mile of the project is located. The short piece on the west end lies within the Tampa city limits. The Federal-Aid job runs east and west along Hillsborough Avenue from the center line of Nebraska Avenue on the west, to the highway overpass of the Atlantic Coast Line Railroad on the east. At the bridge the new roadway transitions into the existing 24-foot highway that continues eastward to Plant City.

The old pavement was on the center line of the new right-of-way, and could not be removed until the contractors had established a roadway for handling two lanes of traffic in both directions east and west. Besides maintaining east-west traffic, they also had to take care of north-south traffic on the many intersecting streets and roads in this busy suburban area of Florida's third largest city. Accordingly, the construction program followed this pattern. The northerly 11-foot half of the west-bound 22-foot lane was paved first from the east to the west end. Then the adjoining 16½-foot strip of lime-rock base was laid, providing two lanes for traffic flow in both directions.

C. & E. M. Photo
On the U. S. 41 reconstruction job in Florida, a Mack truck carrying five batches empties into the skip of a Ransome 34-E single-drum paver working outside the forms.

With traffic taken care of, the old pavement was then removed. No difficulties were encountered here, as the

(*Continued on next page*)



Top — An inside job. A 2 yd. Lorain loading muck within the diversion tunnel.

Center — A Lorain Moto-Crane erects steel for east portal of diversion tunnel.

Lower Left — A Lorain-820 crane hoisting concrete buckets on one of the dam structures.

Downsville Dam, in the foothills of the Catskills, is part of a current $52,000,000 project so New York's millions will have more water "on tap." The $13,000,000 Downsville Dam is being done by Walsh Constr. Co. (Davenport, Ia. and New York) and B. Perini & Sons (Framingham, Mass.). For years both of these names have been associated with many of the nation's biggest jobs . . . and where they've gone, so have Lorains. Between them they've purchased 49 Lorains — 25 for Walsh, 24 for Perini. Such proof of owner satisfaction is repeated again and again with contractors — large and small — all over the nation. Find out why successful contractors, who once they experience Lorain performance, keep repeating on Lorains. Just ask your nearest Thew-Lorain distributor for facts, figures and proof!

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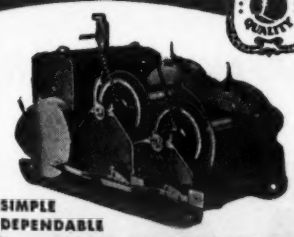

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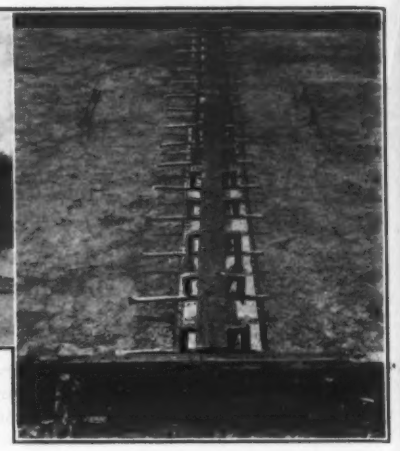

C. & E. M. Photos
Three views of the Brinson and Cone Brothers job: at left, the batch plant, where a Mack truck gets loaded with aggregate under a Blaw-Knox bin; center, a Ransome 34-E paver drops a batch of concrete on the subgrade; right, the Nelson-type expansion-joint holder in two 11-foot lengths across the 22-foot width between Blaw-Knox forms.

Good Progress Made On Concrete Highway

(Continued from preceding page)

plain concrete laid on a non-stabilized subgrade broke up readily under the impact of a 3,600-pound drop hammer. In 11 days the old pavement was broken into rubble, and hauled an average distance of 31 miles to the Davis Causeway crossing Tampa Bay where it was spoiled along the fill. Thus the way was cleared for paving the remaining 11-foot strip of the west-bound and all the east-bound half of the highway. Here the concrete was laid the full 22-foot width, again working from east to west.

During the paving of the second 11-foot lane on the west-bound roadway, the contractor completed the 3-mile stretch in just a fraction over 7 consecutive working days. Working a 10-hour day, the paving crew averaged 2,400 linear feet per day of concrete 11 feet wide x 7 inches thick.

Road Drainage

Installing the road drainage system of course took precedence over everything else at the start of the project. In general, storm water drains to the sides of the pavement into inlets along the curbs. From the inlets, laterals run to the main sewer line underneath the rock base section along the north side of the highway. Trenches for this pipe line were from 5 to 14 feet deep. From that sewer paralleling the center line of the road, four lines carry off the water which eventually drains into the Hillsborough River and thence into Tampa Bay. This system drains the entire right-of-way. On the outfall line, trenches 20 feet deep were necessary.

The 1948-49 winter weather in Florida was probably unsurpassed from a construction standpoint, because of the dry conditions and negligible rainfall. The contractors were not remiss in taking advantage of this great break in the weather. Some difficulty was experienced in obtaining the 6¾ miles of reinforced-concrete pipe from 15 to 54 inches in diameter. Pipe was purchased from the three plants at Tampa, Sanford, and Jacksonville, Fla., of the Sherman Concrete Pipe Co., and also from the Lakeland, Fla., plant of the Lakeland Cement Co. Delivery to the job was handled chiefly by trucks, where the pipe was then unloaded by crane and pipe hook, and placed directly into the prepared trenches. Joints were of cement-sand mortar.

To speed the drainage work, as many as 6 crews were employed laying pipe. In one 40-day period, 3 miles of 15 to 48-inch pipe were installed. At one time 9 draglines were on the job digging trenches and setting pipe; they included 5 Koehrings, 2 Bucyrus-Eries, a P&H, and a Lorain. The most remarkable point about the drainage work was the absence of water. Ordinarily in this section, like most of Florida, ground water is encountered a few feet below the surface. Because of the very dry season, no water was struck at all during the sewer work. The contractor had wellpoints and pumps on hand but did not have to use them. The dry clay sides of the deep trenches stood firm and solid, and required no sheeting. Yet when the job was bid, water covered the entire area. Fickle nature seemed to be atoning for the extremely wet winter of 1947-48.

Grading Operations

The pavement was laid on a 12-inch stabilized-base course having a bearing value of 55 pounds to the square inch, and extending out beyond the curb line. This suitable base was obtained by hauling in clay for blending with the low-bearing sandy subgrade covering this section. The clay was obtained from a pit, an average 10-mile haul from the job, and mixed in the proportions 25 per cent to 75 per cent sand, or about 3 inches of clay to 9 inches of sand.

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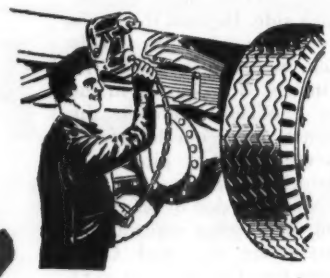
STOP LOOK LESSEN



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C. & E. M. Photos

At the rear of the Blaw-Knox dual-screed finishing machine which Brinson used on the Florida road job was attached a wheel for cutting the center-line joint of the 22-foot pavement (at left). Horizontal finishing was handled with a bullfloat swung by two powerful negroes working from a double bridge (above).

The mixing was done in two 6-inch layers.

The clay was loaded with a dragline into a fleet of 9 trucks—three 14-yard Macks and six 3-yard Chevrolets—which dumped the material on the subgrade. There it was spread full width by a Caterpillar No. 12 motor grader and then mixed into the sand by a pair of Seaman Pulvi-Mixers working in 4-foot lanes. Each lift was watered if necessary, and compacted with three different types of rolling — sheepsfoot, Galion 3-wheel 10-ton smooth-wheel, and a rubber-tire traffic roller. In this manner bearing values of 100 pounds per square inch were obtained, well above the required 55 pounds.

Roadway grading was handled by a couple of D8 tractors with Caterpillar 12-yard scrapers, and 3 Caterpillar 10-yard DW10 wagons which were loaded by a dragline. Two tractor-dozers were also on the job—an International TD-18, and a Caterpillar D7.

The Ocala lime-rock base material, for the 16½-foot strips bordering the concrete, was bought from the United Limerock Co. at Williston, Fla., and shipped by rail 100 miles to the job site. It was graded from 2-inch down, and its 8-inch depth was spread in two courses. Each course was wet down and rolled with a 3-wheel 10-ton smooth-wheel roller. The rock base is surfaced with a 1-inch Type I asphaltic-concrete surface over a 1-inch binder course. A commercial plant right on the job supplied the hot-mix.

Roadway grading was a small item, as the cuts and fills were shallow. Slopes are either 4 to 1 or 2 to 1 to suit the adjoining land of a property owner.

Batch Plant

A concrete batch plant was set up near a siding of the Seaboard Airline Railway only a few hundred feet north of the center of the job, thus making the average haul of the batch trucks only ¾ mile. Sand was obtained from the Diamond Sand Co. at Lake Wales, Fla., 55 miles distant. Crushed stone for the coarse aggregate came 55 miles from the Florida Crushed Stone Co. at Brooksville, Fla. Both materials were shipped by rail in gondola cars which were unloaded by a Koehring crane with a 55-foot boom and a Blaw-Knox 1½-yard clamshell bucket. The aggregate was either stockpiled or loaded into a Blaw-Knox 150-ton 3-compartment bin, one compartment for sand and the other two for stone.

Batches were hauled to the paver by 4 Mack diesel trucks, each holding 5 batches; 8-bag batches of 1⅓ cubic yards were used. The trucks backed under the bin for the load of aggregate, then pulled alongside a freight car to get the cement. Bag cement for the job was shipped to the plant from the mill of the Florida Portland Cement Co. at Tampa. The bags were emptied by hand into the batch trucks.

The weights of a typical 8-bag batch were as follows:

Cement	752 lbs.
Sand	1,616 lbs.
Stone	2,568 lbs.
Water—5.7 gals. per bag	378 lbs.
Total	5,314 lbs.

The gradation of the No. 2 stone was as follows:

Sieve Size	Per Cent Passing
3-inch	100
2-inch	97–100
1½-inch	65–90
1-inch	40–75
No. 4	0–5

The gradation of the Type 1 sand used in the mix follows:

Sieve Size	Per Cent Retained
No. 4	0–5
No. 8	0–15
No. 16	3–35
No. 30	30–75
No. 50	65–95
No. 100	95–100

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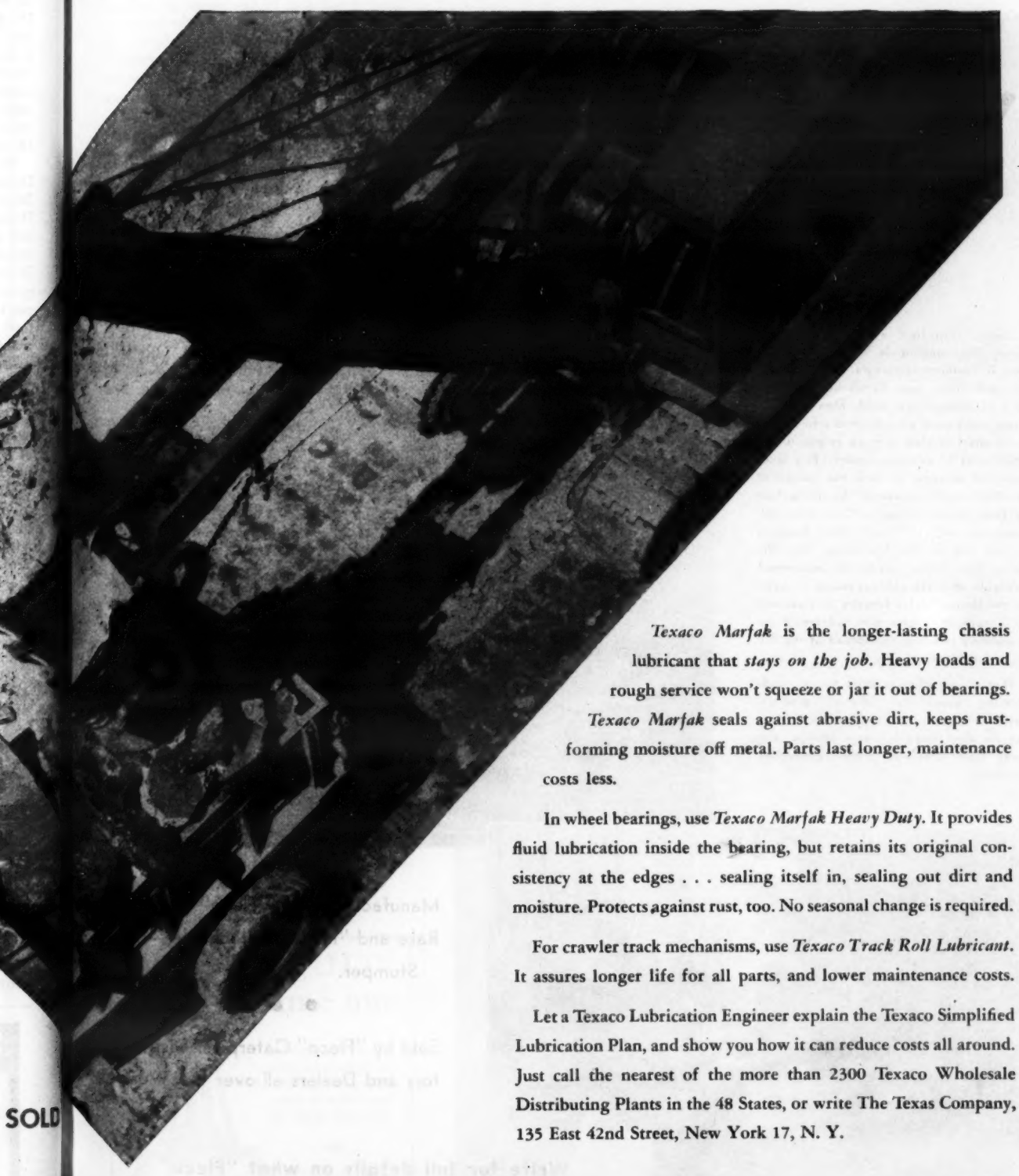

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Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

Good Progress Made On Concrete Highway

(*Continued from preceding page*)

Water for the concrete was obtained from city hydrants along the job and carried to the paver in two 3,000-gallon tank trucks—an Autocar and a Dodge. A connection to the paver was made with a 100-foot length of 2-inch hose. A pump on the paver drew the water from the tanks, but the trucks were also equipped with 2-inch pumps as a stand-by. While one truck was at the paver, the other was going after another tankful of water.

Expansion Joints

No reinforcing is put in concrete pavements in this year-round warm climate, where undue contraction and expansion are not experienced. Expansion joints are set 600 feet apart, with transverse dummy or contraction joints at 20-foot intervals. For the 7-inch uniform pavement, a 6-inch-high Flexcell x ¾-inch-thick premolded expansion joint was used. The material came in 11-foot strips, two sections being used in laying the full-width east-bound half of the pavement. The joints were supported by a Nelson holder. Passing through the joint material on 15-inch centers are ¾-inch plain round steel dowels, 16 inches long. The dowels are wrapped in Kraft paper, and move in a sleeve slipped over one side. The three contraction joints on each side of an expansion joint have dowel bars of similar size and spacing, but all the rest of the dummy joints are without steel.

Along the longitudinal center-line joint of the pavement, ½-inch tie bars, 4 feet long, were placed on 5-foot centers at mid-slab depth transversely across the concrete. In pouring the full 22-foot width these tie bars were supported on seats set on the subgrade after the forms were set. On the first half of the job, which was done in two 11-foot lanes, a longitudinal bond was made with a 1-inch metal keyway bolted to the forms. The tie bars were bent at right angles, and half their lengths enclosed in the key until the forms were removed. Then the bars were straightened out so as to extend into the other half of the slab.

On the job were 4,000 linear feet of 9-inch Blaw-Knox steel road forms, with at least 500 feet always being kept in perfect alignment ahead of the paver. The grade was cut to precise cross section by an R-B Finegrader pulled by an International TD-18 tractor. The forms were set by hand and coated with a film of oil, joints and tie bars were set in place, the subgrade was wet down, all in preparation for the laying of the concrete.

Paving Operations

Paving was done by a Ransome 34-E single-drum paver always working outside the forms. The stabilized roadbed permitted the big batch trucks to back up to the skip and maneuver without difficulty. Batches were mixed one minute, then the concrete was discharged between the forms in front of a Blaw-Knox dual-screed finishing machine. No vibrating was done. The puddlers shoveled up a low row of concrete along the base of the forms on each side ahead of the finishing machine. At the rear of the finishing machine a wheel was attached for cutting the longitudinal center-line joint in the full-width pavement. Behind the finisher came a double bridge, from which the finishers pressed into the concrete steel strips for the longitudinal and transverse contraction joints. The strips were ½ inch thick x 2 inches deep x 11 feet long.

After the concrete had been placed around the joints containing the dowels, the Nelson-type joint holders were removed. A wooden strip with nails projecting from the bottom was pressed down into the expansion-joint material to fill the slot, since the joint was left 1 inch low. Under the joint a 12-inch-wide metal plate had been placed the width of the slab as a bottom support. After the finishers complete their edging around the expansion joint, the wooden strip is removed.

Longitudinal finishing was done with a bullfloat swung by two powerful negroes working from a double bridge. The surface was then carefully checked with 10-foot long-handled straightedges, and roughened ever so slightly by pulling two 4-ply stitched canvas belts, 8 inches wide, lengthwise over the slab. Working from another bridge the finishers edged the joints with a ¼-inch-radius edging tool, except along the sides bordering the lime-rock base where the radius is ¾ inch. As the concrete began to set up, the metal strips for the joints were removed. From the final bridge in line, a spray machine applied Tru-Cure curing compound. The pavement is finished with a parabolic crown, having a total pitch to the side of 0.38 foot for a 24-foot width; this includes half of the 4-foot median strip. Traffic was permitted after 14 days.

After the two 22-foot concrete lanes were paved, the 4-foot median strip was filled in with concrete, and given a white, cement-mortar scored surface. The median strip is flush with the rest of the pavement. The joints were all poured at the same time with asphalt filler.

Commendation

The project employed a maximum of 180 men, of which 40 were in the paving

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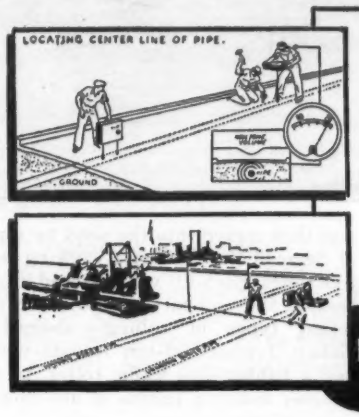

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Thrifty and efficient units for all land-clearing operations, "Fleco" products have won acclaim not only for fire fighting but for eliminating boulders, stumps, and trees from otherwise highly productive farmlands.

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crew. Prior to and while the job was going on, six utilities were engaged in moving poles or underground facilities for two water companies, a sanitary-sewer department, a gas company, a telephone company, and power and light companies. Despite the intensive and concentrated nature of the work, the State Road Department Division Office at Bartow received no complaints either from property owners or the traveling public. Furthermore, the Federal engineers of the Public Roads Administration had this to say in their February report concerning the Tampa paving job:

"All construction phases are being efficiently carried on, and specifications are being strictly adhered to. The contractors are making excellent progress, and this month's estimate will probably exceed $250,000. The contractors should be cited for efficient management, the excellent workmanship of their personnel, and the equipment placed on the project. Without detracting from the credit due the contractors, it must be noticed that this rate of progress and quality of work could not have been obtained without full cooperation from the State's engineers, who are doing exceptionally fine work in staking out, inspection, and general supervision on this project."

With regard to the equipment on the job, S. B. Brinson of the Brinson Construction Co., who looked after the work of his company, estimated that the value of the equipment on this $1,325,759 contract amounted to approximately $400,000. D. H. Stoll was General Superintendent for the Brinson Construction Co., and M. R. Carn was Paving Superintendent. The Cone Bros. Contracting Co. was represented by W. C. Little as Superintendent.

Quantities

The major items on the 3-mile concrete-paving contract included the following:

Excavation	36,628 cu. yds.
Removal of existing pavement	51,134 sq. yds.
Ocala rock base, 8-inch	62,941 sq. yds.
Asphaltic-concrete surface and binder	63,685 sq. yds.
Bituminous material	80,543 gals.
Cem. conc. pvt., 7-inch plain	84,797 sq. yds.
Conc. pipe, 15 to 54-inch	6¾ miles
Conc. curb and gutter	29,129 lin. ft.
Conc. sidewalk, 4-inch	199,101 sq. ft.
Conc. sidewalk, 6-inch	26,187 sq. ft.
Stabilizing to 12-inch depth	156,257 sq. yds.

For the Florida State Road Department, Richey Green is Senior Project Engineer in charge of the contract, assisted by C. A. Benedict. The job is located in Division 1 of which H. E. Lewis is Division Engineer with headquarters at Bartow. The Department is headed by Sam P. Turnbull, State Highway Engineer at Tallahassee, assisted by Scott Reynolds.

Crusher Sales Engineer

The Pennsylvania Crusher Co., Division of Bath Iron Works, announces the promotion of Woodrow W. West to Chief Sales Engineer. He will be located at the main offices of the company in Philadelphia, Pa.

C. & E. M. Photo

On the Florida job, left to right: Senior Project Engineer Richey Green; S. B. Brinson, President of Brinson Construction Co.; and Paving Superintendent M. R. Carn.

Literature on Equipment

A catalog on the complete Jaeger line of construction, paving, and industrial equipment has been released by The Jaeger Machine Co., 550 W. Spring St., Columbus 16, Ohio. This catalog, No. GC-9, covers pumps, compressors, Speedline mixers, Hydro-Hoists, truck-mixers, and agitators, Hoister towers, and a variety of paving machinery manufactured by the company.

The booklet includes general specifications, descriptions, photographs, and drawings of all types and models. Though this 36-page catalog is quite complete, more-detailed information on any one type of equipment may be secured from the smaller equipment catalogs Jaeger issues.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 80 for the catalog on the complete line. For catalogs on particular units, Circle No. 81 and indicate on the card the equipment in which you are interested.

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British Team Seeks Know-How in U. S.

Representatives of Great Britain's building industry have recently completed a study of American methods of constructing low and medium-cost housing, apartments, hospitals, schools, commercial buildings, theatres, stores, and industrial plants. During a six-week tour in the United States, they studied design methods, costs, procedures, and the manner in which owner, architect, engineer, contractor, and laborer cooperate to expedite housing, labor relations, and financing.

The 17-man team included architects, engineers, surveyors, and workers. Its visit was sponsored jointly by the Anglo-American Council on Productivity and the Economic Cooperation Administration. The ECA was aided in arranging for the study-tour by the Associated General Contractors of America, the American Institute of Architects and Building, and the Construction Trades Department of the American Federation of Labor.

The team visited building projects in seven cities—Washington, New York, Chicago, Detroit, Cleveland, Buffalo, and Boston. It was particularly interested in methods of using building materials other than lumber for the construction of houses.

The group also met leading American contractors and architects, and government and labor officials. Team members attended lectures at the University of Illinois, Harvard University, and Massachusetts Institute of Technology. The lectures covered the latest developments in the construction field.

The significance of this visit was keynoted in a welcoming address given the British team by Philip D. Reed, Joint Chairman of the U. S. Section of the Anglo-American Council on Productivity. Mr. Reed remarked, "The ECA aid to European nations is changing from one of material and matériel to ideas—to know-how". Thus there is a shift in the planning, from giving actual goods to financing technical training and learning. In discussing our industrial operation, Mr. Read said: "Competitive contracting, in spite of inherent difficulties and troubles, reduces cost and therefore price, and so increases productivity. I do not suggest that you [the British] accept this system, but merely that you notice carefully this aspect of our economy."

Robert Owen Lloyd (left), leader of the British building team of architects and engineers visiting the United States, is greeted by Peter W. Eller, Chairman of the Board of Governors of the Building Trades Employers' Association of New York City.

Construction Equipment

A catalog on the company's complete line of construction equipment is available from the Insley Mfg. Corp., 800 N. Olney St., Indianapolis 6, Ind. This catalog describes Insley shovels, trench hoes, cranes, clamshells, draglines, lorries, trailers, concrete-placing equipment, and hoppers. Typical job photographs, specifications, drawings, and diagrams explain the features of the equipment and its field use.

The earth-digging units have ½-cubic-yard buckets with reversible and removable teeth. Two types of trailers are manufactured for excavator transportation. Some seven pages of the catalog are devoted to the integral parts and assemblies that make up the company's K-12 line of excavator equipment. Another seven pages list the specifications and diagram the working ranges of the K-12 units.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 5.

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42	43	44	45	46	47	48	49	50	51	123	124	125	126	127	128	129			
52	53	54	55	56	57	58	59	60	61	130	131	132	133	134	135	136			
62	63	64	65	66	67	68	69	70	71	137	138	139	140	141	142	143			
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Contractors and Engineers Monthly - Request Card - Sept. '49

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Closed-car comfort for tractors—with the Automatic Tractorkabs. They fit all leading makes of tractors.

Tractor Cab Allows All-Weather Comfort

The new Automatic Tractorkabs, which fit all leading makes and models of tractors, are designed to give your tractor "closed-car" comfort. They are made by the Automatic Equipment Mfg. Co. of Pender, Nebr., and are available in C, K, and S Series to fit various makes of tractors.

These cabs feature large, hinged windshields and side windows of clear shatterproof glass, rubber-mounted in heavy aluminum T-frames; steel and aluminum construction with insulated auto-type underseal; and a heavy canvas front curtain to shut out completely exhaust and oil fumes, dust, heat, and cold. The Heater Hood, made by the same company, fits snugly over the engine and is designed to increase the life and all-weather operation of the tractor.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 13.

Self-Priming Pumps

A line of self-priming centrifugal pumps is made by The Deming Co., Salem, Ohio. It includes 6 stationary models with a range of capacities from 10 to 300 gpm against heads up to 250 feet, and one portable model with a capacity of 10 to 90 gpm under heads from 80 to 15 feet.

A positive non-siphoning feature is said to insure automatic re-priming regardless of the amount of backwash or suction-line surge encountered when the pump stops. The pumps are designed to be completely self-priming on suction lifts up to 25 feet. The semi-inclosed non-clogging type of impeller permits passage of usual-size solids encountered in dewatering service.

All stationary models have electric motors. The portable type has a 1½-hp four-cycle air-cooled gasoline engine.

Further information may be secured from the company by requesting Bulletin 3300-A. Or use the Request Card at page 16. Circle No. 139.

Small Concrete Mixers

Information is now available on the line of 3½-cubic-foot concrete mixers manufactured by Vanco Products, Inc., 222 E. Cucharras St., Colorado Springs, Colo. Data sheets describe each model and list prices. There are both hand-operated and engine-driven models, skid or wheel-mounted.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 122.

Rockwell Sales Division

Rockwell Mfg. Co., of Pittsburgh, Pa., has announced the formation of a Power Tool Division. This new division has headquarters in Milwaukee and serves as the selling organization for the four divisions of Rockwell engaged in the manufacture of various types of power tools. Robert P. Melius heads the new organization.

Concrete-Vibrator Data

An illustrated 12-page catalog on pneumatic and electric concrete vibrators has been issued by the Chicago Pneumatic Tool Co., 6 E. 44th St., New York 17, N. Y. Bulletin 814-2 points out the applications and features of the models and includes specifications and on-the-job photographs.

The catalog explains the principle followed in developing the CP line of vibrators: high frequency and low amplitude for those models used in narrow forms, and a decrease in frequency with a corresponding increase in amplitude for those models used in wide forms and heavier concretes. Motor-in-head or external-motor designs are available.

Also described in the folder are power units for the electric vibrators, furnished in a standard stock size of 15 kw (other sizes, 3 to 50 kw, are built to order); the new CP-220 electric vibrator and accompanying 2-kw gasoline-driven generator; and distribution boxes, plugs, and receptacles.

This literature may be obtained from the company, or use the Request Card at page 16. Circle No. 18.

For Welding and Cutting

A 24-page illustrated catalog, No. 48, is available from K-G Welding & Cutting Co., Inc., 515 W. 29th St., New York 1, N. Y. It covers the company's line of standard, machine, heavy-duty, and underwater cutting torches; three models of welding torches; regulators; and accessory equipment. Photographs, specifications, drawings, and text point out the features of each of the products. Four pages are devoted to cutting, welding, or combination outfits.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 28.

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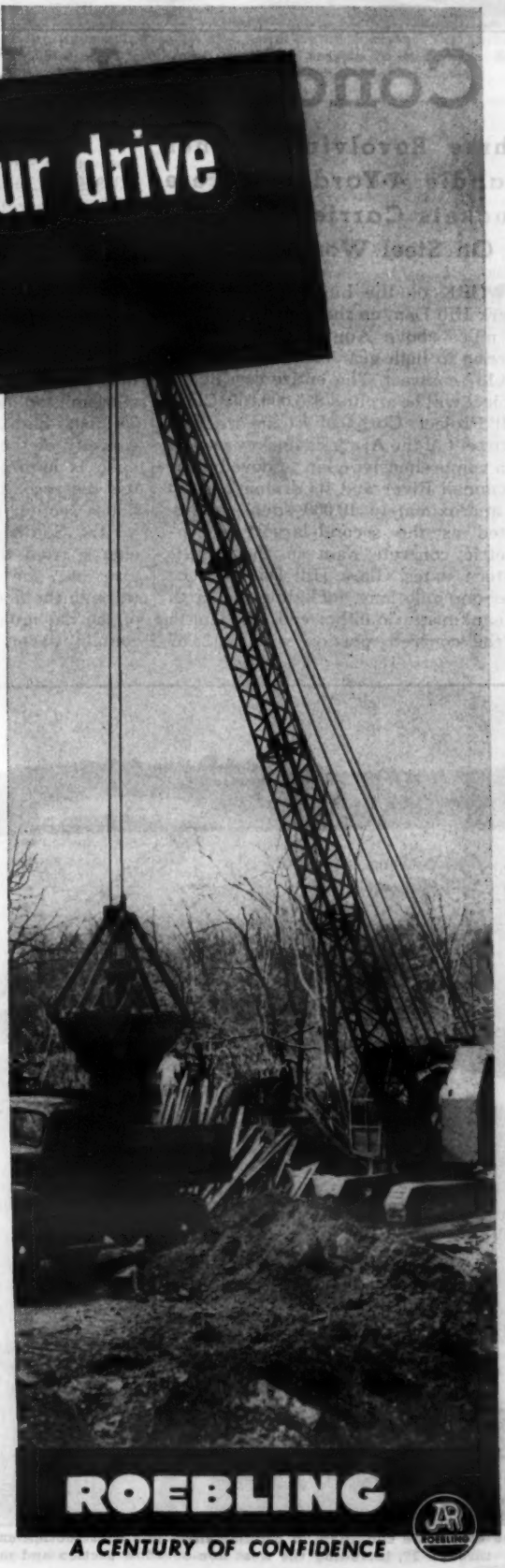

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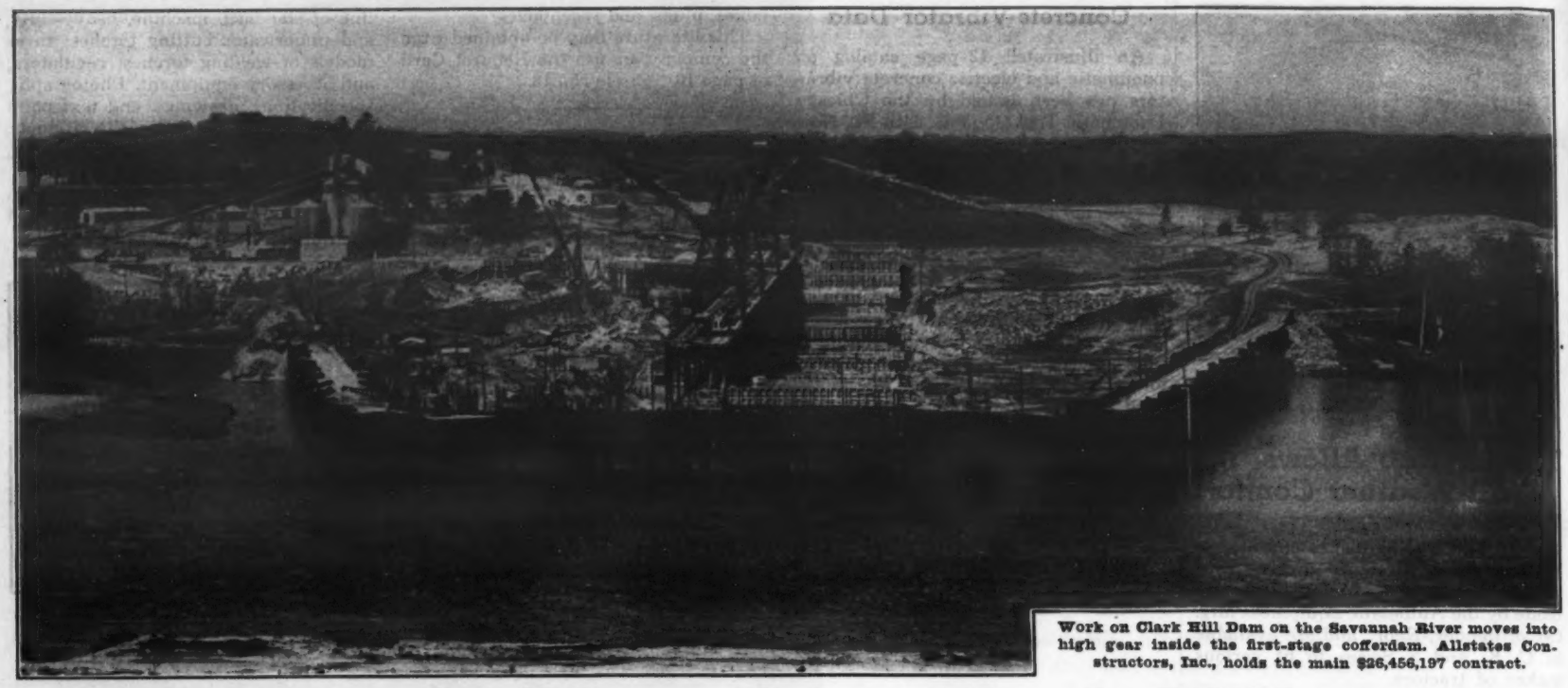


Work on Clark Hill Dam on the Savannah River moves into high gear inside the first-stage cofferdam. Allstates Constructors, Inc., holds the main $26,456,197 contract.

Concrete Is Placed in Clark Hill Dam, Savannah River

Three Revolving Cranes Handle 4-Yard Concrete Buckets Carried by Cars On Steel Work Trestle

By WILLIAM H. QUIRK
Eastern Editor

✦ WORK on the huge multi-purpose Clark Hill Dam on the Savannah River, 21 miles above Augusta, Ga., is now moving in high gear on the main $26,456,197 contract. The entire cost of the project will be around $76,000,000. Clark Hill Project, Corps of Engineers, Department of the Army, is the key project in a comprehensive plan to develop the Savannah River and its drainage basin of approximately 10,000 square miles. Rated as the second-largest hydroelectric concrete dam in the southeastern states, Clark Hill Dam will be over one mile long, including the earth embankments on either end. The length of the concrete portion will be 2,282 feet, while the lengths of the west and east earth embankments are 2,069 and 1,329 feet, for a total of 5,680 feet.

The concrete section will have a maximum height of 200 feet, which will also be the maximum width at the base. The maximum height and base width of the earth embankments are 155 and 880 feet respectively, exclusive of the depth of the core trench. The 1,096-foot concrete spillway section, across the main channel of the river, will have 23 steel taintor gates, each 40 feet long x 35 feet high. The maximum flood capacity of the spillway with all gates open is approximately 1,055,000 cubic feet per second. The intake and powerhouse section will adjoin the spillway on the South Carolina side. The discharge from the overflow section can also use the original river channel through the flood plain on the left bank of the Savannah. The powerhouse will contain seven generators driven by water turbines, each producing 55,000 hp under a 136-foot head; each generator will have a prime capacity of 40,000 kilowatts. Seven penstocks will be constructed through the dam to conduct water to the seven turbines.

C. & E. M. Photos

The first-stage cofferdam of cellular sheet-pile construction encloses dam monoliths 1 through 27, including the west non-overflow section and most of the spillway.

The reservoir, with a total capacity of 2,900,000 acre-feet, will provide storage for excess waters at flood peaks that will minimize the average flood losses which menace the valley. In addition to flood storage, which will always be available, a considerable measure of flood protection will be derived during the normal operation of the pool. The controlled release of waters impounded behind the dam will assist navigation below Augusta. It will insure a minimum flow during dry seasons sufficient to give an all-year 7-foot channel from Augusta to Savannah, 200 miles away.

In addition to the hydroelectric-power, navigation, and flood-control features of the project, public-use areas will be provided for parks, camp sites, and trailer cities which will be located on the perimeter of the great reservoir that will have some 900 miles of wooded shore line. This lake will cover 78,500 acres, and will extend 37 miles up the Savannah River from the dam site, 27 miles up Georgia's Little River to the west, and 15½ miles up South Carolina's Little River to the east.

Prior Contracts

Preliminary construction contracts on the Clark Hill Project got under way late in 1946 under the direction of the Savannah District, Corps of Engineers. These included construction of an access road and railroad to the site; building the first stage of the west earth embankment; exploratory borings; construction of the east embankment; dredging a diversion channel for the river along the east or left bank of the flood plain; and building the first-stage cofferdam within which the west concrete half of the dam is now already well along. (See C. & E. M., July, 1947, pg. 25, and Aug., 1947, pg. 21.)

Towards the end of 1947 the Corps of Engineers awarded a contract for the construction of the main section of the dam to Allstates Constructors, Inc., on its low bid of $26,456,197. This firm is composed of six large contracting companies that undertook the work on a joint-venture basis: Walsh Construction Co. of New York, N. Y.; B. Perini & Sons, Inc., of Framingham, Mass.; J. A. Jones Construction Co. of Charlotte, N. C.; Blythe Brothers of Charlotte, N. C.; Ralph E. Mills, Inc., of Roanoke, Va.; and Massman Construction Co. of Kansas City, Mo.

Work on this contract got under way in December, 1947, and is scheduled to be completed in January, 1952. The contractor's preliminary work consisted of assembling and setting up the necessary equipment to do the job. By the middle of October, 1948, the first batch of concrete was placed in the dam. Concrete operations continued throughout the winter and spring until, by the middle of May, 1949, some 265,000 cubic yards of concrete had been placed within the first-stage cofferdam. This portion of the dam was not complete, of course, but concrete pouring stopped at that point to permit diversion of the river over the low blocks when the second-stage cofferdam diverts the river.

The second-stage cofferdam will be completed in the eastern half of the river, and the first-stage cofferdam will be removed. The river will then pass over monoliths left purposely low in the initial west-half construction of the dam. Inside the second-stage cofferdam the excavation will be made for the powerhouse and the non-overflow section of the concrete dam. The steel work trestle for the concrete operations will be extended clear across the river to the east or left bank. By October, 1949, the contractor expects to resume placing concrete which will continue in that second-stage cofferdam until the summer of 1950. In the meantime connections will be made at each end of the concrete structure to the earth embankments already in place so as to restrain any high water that may occur.

Forty-Seven Monoliths

The 2,282-foot concrete section of the dam is divided into 47 monoliths, numbered from the west to the east end. From 1 to 6 is a non-overflow section; 7 to 30 is the spillway; 31 to 37 is the intake and powerhouse section; 38 to 47 is another non-overflow section at the east end. The non-overflow and spillway monoliths are 48 feet in length measured along the axis of the dam, while the monoliths in the intake sec-

(Continued on page 85)

All Aggregate Is Taken From Quarry Near Site; Processed in Large Plant And Delivered to Mixers

✦ ONE of the remarkable features of the Clark Hill Project is the location of the dam close to a blue-granite quarry, from which is produced the crushed rock and sand for the 1,050,000 cubic yards of concrete going into the structure. The quarry is less than ½ mile downstream from the dam on the right bank of the Savannah River. Early this spring the height of quarry face ranged from 55 to 75 feet for 1,000 feet in length. Before the dam is completed, the face is expected to reach a height of 115 feet through subsequent blasting.

At the start of quarry operations, 85-foot holes were made with three Bucyrus-Erie well drills. The holes were 25 feet apart and 20 feet back from the quarry face, with a 6⅝-inch diameter. They were charged with Hercules dynamite—either 6 x 22-inch Gelamite B, or 6 x 18-inch Hercumite D. As many as 18 well drill holes, containing from 8,500 to 11,000 pounds of powder, were shot at a time.

The general clean-up and leveling of the quarry floor was done with wagon drills of which there are 14 on the job, half Ingersoll-Rand and half Gardner-Denver. From eight to nine of these wagon drills were usually active in removing the bottom lift from the quarry floor to an average depth of 16 feet. Holes were drilled on 4-foot centers both ways using 1¼-inch round drill steel in 6, 12, and 18-foot lengths. The wagon-drill steel was equipped with Rockbit Sales & Service 2-inch carbide and carboloy bits. Many of these bits lasted for a full day's drilling, where the conventional-type bits were good for only 2 feet in the hard granite.

Compressor House

Air for the wagon drills is piped to the quarry from a compressor house, also located on the right bank of the Savannah River and downstream of the dam. Four Ingersoll-Rand stationary compressors—two at 2,700 cfm and two at 1,000 cfm—supply air for the drilling equipment, and for the high-pressure hosing in the dam construction. The compressors are driven by 2,300-volt synchronous motors.

Wet-head drills are used in the quarry to lay the dust caused by the high silica content of the granite. This is not only a safety precaution for the health of the drillers, but it also extends the life of the drills by keeping them cool. Wagon-drill holes are charged with Atlas 60 per cent dynamite, averaging 30 sticks or 15 pounds in a 16-foot hole. The average shot covers from 285 to 300 holes.

Other drilling equipment includes a Joy wagon drill mounted on a truck, and used for angle holes; and 7 Ingersoll-Rand Jackhamers for breaking up large chunks of rock into sizes that the shovels can handle easily. Atlas 40 per cent dynamite suffices for this secondary blasting.

Two Gorman-Rupp 4-inch pumps, running about 75 per cent of the working time, keep the quarry dry by pumping seepage and drill water out to a near-by creek. These are assisted by two 2-inch pumps spotted around the quarry for pumping water to the larger units. The drill crews work three shifts, with from 50 to 60 men on each of the day shifts, and 45 men on the night shift. All power and light is furnished by a 5,000-kv substation on the site which is connected to a 44,000-volt line 2 miles away.

The rock is handled by three shovels and a backhoe. The shovels included a Marion 3¼-yard, Bucyrus-Erie 3-yard, and a Northwest 1½-yard; a Northwest ¼-yard Pullshovel handles the smaller fragments around the

(*Continued on next page*)

Concrete for the dam travels to the pour from the C. S. Johnson batching and mixing plant in Johnson Lo-Slump buckets carried on flatcars. Plymouth diesel locomotives draw the flatcars.

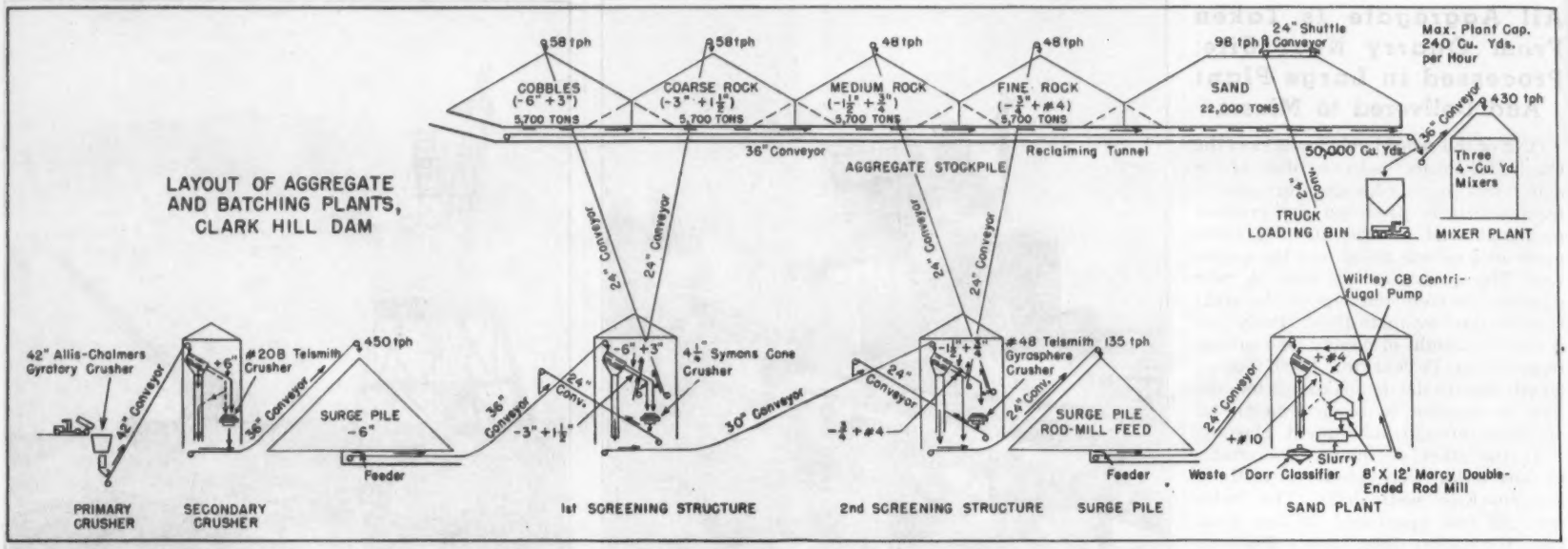
From the approach trestle, the work trains carrying the buckets of concrete move out onto the work trestle to the three 82C American Revolver cranes that place the concrete.

Here one of the cranes picks a 4-yard bucket from a flatcar . . .

. . . and lowers it to the forms in monolith 11, in the spillway.

With the bucket out of the way in this view, notice the wooden form work and the catwalk hung beneath the deck of the trestle.

Finally comes concrete clean-up work with air and water pressure hose. This is monolith 6 in the non-overflow section.



Aggregate for Dam From Near-By Quarry

(*Continued from preceding page*)

quarry floor. A Caterpillar D8 dozer works with the shovels. They load to a fleet of ten end-dump Euclids that average 10 yards of rock per load on a 1,000-foot haul to the primary unit of the crushing plant. The shovels work two shifts.

Aggregate Production

The aggregate production plant stretches out over ½ mile of ground below the dam, from the point where the quarry rock is dumped into the primary crusher to the end of the final conveyor belt at the mixing plant. At the lower end of the crushing plant the Euclids dump their loads of rock into a receiving hopper that houses an Allis-Chalmers 42-inch primary gyratory crusher powered by a Westinghouse 250-hp 600-rpm 2,300-volt motor. At the side of the receiving hopper is an A-frame equipped with an electric hoist and hook for maneuvering rocks that are hung up along the sides, and to direct them into the crusher. The crushed rock is chuted onto a 42-inch belt, 200 feet long, known as Flight 1. All belts at the plant are made of Goodyear cord rubber.

This belt leads upward to a Robins Gyrex 5 x 14-foot C-10 double-deck screen operated by a 15-hp motor. The top and bottom screens are 6 and 3-inch mesh respectively. What does not pass through the upper screen slides off into a Telsmith 20B 20-inch gyratory crusher driven by a G-E 125-hp 575-rpm 2,300-volt motor. This motor also operates Flight 1 conveyor belt. Material passing the screen, together with what was processed in the secondary crusher, goes on to a 36-inch x 300-foot Flight 2 conveyor to a surge pile. The second belt is driven by a 50-hp motor. Stone, minus-6-inch in size, comes from the two crushers to the surge pile at the rate of 450 tons per hour.

Underneath this surge or primary stockpile runs a tunnel, 8 feet wide x 7 feet high, constructed of fabricated steel sections bolted together. The tunnel is about 250 feet long and contains Flight 3 conveyor, a 36-inch belt that continues on for 600 feet to the first screening structure. A Jeffrey 48-inch feeder admits the stone from the stockpile onto the belt which is powered by an 85-hp motor. A hand chute is also in readiness in case anything goes wrong with the mechanical feeder.

Screening Structures

Flight 3 conveyor discharges the material into a chute that breaks over two 5 x 12-foot Telsmith 26S double-deck scalping screens driven by a 15-hp motor. The 3½-inch mesh on the upper-deck screen retains 6-inch stone, while the 1 15/16-inch mesh on the lower deck retains 3-inch stone. When stone less than 3-inch is being manufactured, material from both screens is turned into a Symons 4¼-foot cone crusher driven by a 150-hp 1,150-rpm 2,300-volt motor. After passing through

(*Continued on next page*)

NOW 3 in the SINCLAIR to meet every

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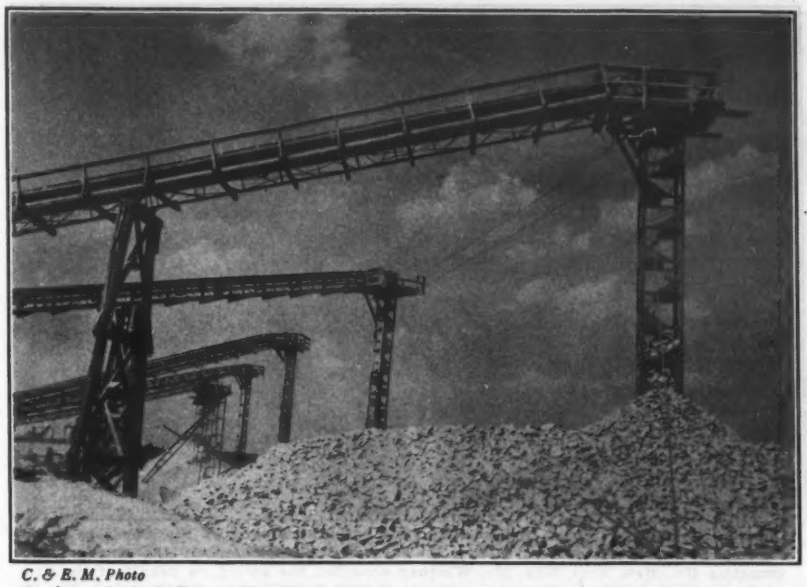
this crusher the stone travels back to the Flight 3 conveyor on a Flight 4 return belt, 24 inches x 125 feet, driven by a 10-hp motor. Flight 3 puts the material through the screening structure once more.

At this point, cobbles (—6 to +3) and coarse rock (—3 to +1½) are taken out to storage piles off to the side, beneath which runs a reclaiming tunnel. Each of these two sizes is manufactured at the rate of 58 tons per hour, and each stockpile has a capacity of 5,700 tons. Flights 9 and 10 feed respectively the cobbles and coarse-rock stockpiles. Both belts are 24-inch x 200-foot, and are driven by 10-hp motors. At the end of each conveyor leading to a stockpile is a rock ladder, a vertical succession of skips or buckets. The ladders serve a dual purpose both to support the end of the conveyor, and to keep the rock from breaking into smaller pieces as it would if it made a long fall off the end of the belt.

From the first screening structure, the smaller-sized material containing the fines passes through the screen onto Flight 5 conveyor, a 30-inch x 200-foot belt, driven by a 40-hp motor. This leads to the second screening structure and to two 5 x 12-foot double-deck Vibro King 22-P Telsmith screens operated by a 10-hp motor. The ⅞-inch mesh on the upper deck retains the medium rock (—1½ to +¾) which is carried off to a 5,700-ton stockpile on Flight 11 conveyor, 24 inches x 200 feet, powered by a 10-hp motor. The 7/32 x ⅜-inch mesh on the lower deck retains the fine rock (—¾ to +No. 4) which is carried off to another 5,700-ton stockpile on Flight 12 conveyor, also 24-inch x 200-foot, and driven by a 10-hp motor. Both the medium and fine aggregate are manufactured at the rate of 48 tons per hour.



C. & E. M. Photo
A view of stockpiles at the Clark Hill Dam aggregate-production plant. In the foreground the largest-size stone drops off a conveyor belt and down a rock ladder.

If more fine rock is required, material retained on the upper deck is dropped into a No. 48 Telsmith 48-inch Gyrasphere crusher, powered by a 150-hp 870-rpm 2,300-volt motor. Under the crusher Flight 6 conveyor, 24 inches x 150 feet, off a 10-hp motor, returns the material to Flight 5 belt for further screening at the second screening structure.

Sand Manufacture

Material from the second screening structure that is not sent to the stockpiles travels over Flight 7 conveyor, 24 inches x 350 feet, with a 10-hp motor, to a surge pile at the rate of 138 tons per hour. This pile, containing stone from ¾-inch down, is used for the manufacture of sand. Under the pile is a steel shell tunnel through which runs Flight 8 conveyor, a 24-inch belt that extends out 250 feet to the sand plant. In the roof of the tunnel is a Jeffrey feeder and also a hand chute. As the sand plant is reached, the material is discharged through a forked chute over two 5 x 12-foot double-deck Tyler Tyrock screens powered by a 10-hp motor. The top deck is 3/16-inch mesh, while the wet deck lower screen is 5/64 x 2½-inch.

Material passing through the lower screen falls directly into a Dorr sand classifier driven by a 15-hp motor. What is retained on the lower screen, plus No. 10, may be sent either to the classifier or to the rod mill. Material retained on the top screen, plus No. 4, is sent directly to the 8 x 12-foot double-ended Marcy rod mill, powered by a G-E 350-hp motor, where the sand is manufactured. The slurry discharged from the rod mill is pumped to the classifier by a Wilfley CB centrifugal pump.

The washed sand, minus No. 100, is discharged from the bottom of the turret bowl classifier, and moves over Flight 13 conveyor, 24 inches x 250 feet, operated by a 10-hp motor. The conveyor leads up to a steel trestle, 120 feet long, over which moves a 24-inch shuttle belt 60 feet long. The main conveyor feeds the shuttle conveyor which permits the building up of four adjacent piles of sand. Sand is produced at the rate of 98 tons per hour, and is stored in stockpiles totaling 22,000 tons. Waste material from the classifier runs off to a sump.

To the Mixer Plant

Underneath the five stockpiles of aggregate—cobbles; coarse, medium, and fine stone; and sand—is a steel 7 x 8-foot reclaiming tunnel over 600 feet long. Chutes discharge the material, one grade at a time, onto Flight 14 conveyor, 36 inches x 950 feet long, that runs out of the tunnel and up to a rinsing plant. Here water sprinklers wash off the 6-inch, 3-inch, and 1½-inch stones. The material washed off is collected in a sump and later pumped back to the sand plant for use as sand. Neither the ¾-inch stone nor the sand is washed at the rinsing station. A 50,000-yard truck-loading bin breaks into the line at this point for

(Concluded on next page)

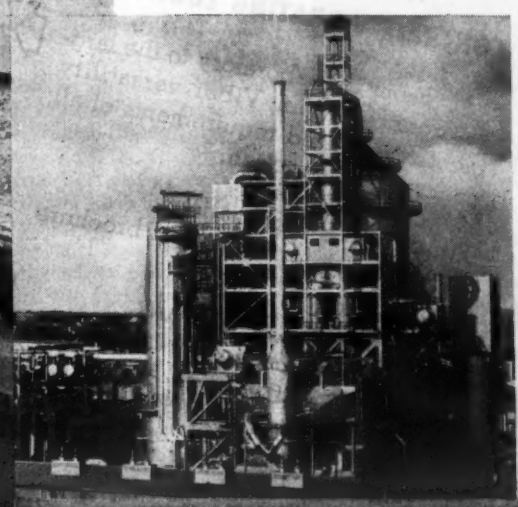
TENOL FAMILY
operating requirement

Two new Tenols now make it possible to meet every operating requirement with one of these superior oils. New—SUPER TENOL and TENOL EXTRA are designed to take care of new conditions and "heavier" duty service to which engines are being subjected.

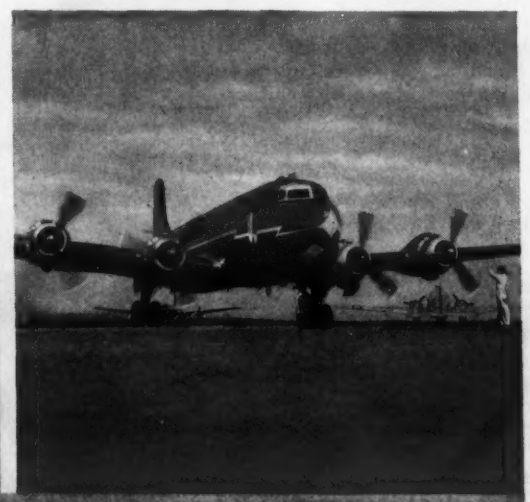
SUPER TENOL meets the engine test requirements of U.S. Army Spec. 2-104 B, Supplemental List 1. It accepts the challenge of continuous, *extra*-hard service and also thwarts cold engine sludge caused in diesels and gasoline engines by long idle and stop-and-go operation. It helps solve the problems caused by the use of improper or high sulphur fuels.

TENOL EXTRA qualifies under U.S. Army Spec. 2-104 B, Supplemental List 2 —and the requirements of Caterpillar Series 2 oil for supercharged diesels, abnormally heavy duty operation and high sulphur fuel.

Use TENOLS as maintenance tools to extend overhaul intervals, engine life.



New Fluid Catalytic Cracking Stills (like the one shown here) are helping to expand Sinclair's refinery output. Sinclair's great refineries are now turning out products at the rate of 130,000,000 gallons of lubricating oil yearly.



About 40% of all the Aircraft Engine Oil used by domestic Airlines in the U.S.A. is supplied by SINCLAIR. The same careful research that developed this high quality oil for the Airlines is put into TENOL and other Sinclair Oils.

HEAVY DUTY LUBRICANTS

FOR LUBRICATION COUNSEL, OR YOU MAY WRITE TO SINCLAIR REFINING COMPANY, 630 FIFTH AVE., NEW YORK 20, N. Y.

Aggregate for Dam From Near-By Quarry

(*Continued from preceding page*)

ease in distributing crushed stone throughout the project.

But the concrete aggregate moves on to the final conveyor belt, Flight 15, 36 inches x 550 feet, that leads up to the mixing plant. Here concrete is turned out by three Koehring 4-yard concentric zone mixers at a maximum plant capacity of 240 cubic yards per hour.

To reduce dust at this aggregate-producing plant, American Blower 48-inch dust collectors have been installed at the primary and secondary crushers, and at both screening structures. Each blower is driven by a 25-hp motor. At the screening structures the screen rooms are sealed off, and the dust fines are drawn off through ducts into tanks in which baffles are built. A water spray then lays the dust.

Aggregate Gradation

The gradation of the four sizes of stone used in the mass concrete of the dam is as follows:

Sieve Size	Per Cent Passing by Weight			
	6–3-inch	3–1½-inch	1½-¾-inch	¾-No. 4
7-inch	100	....	....	....
6-inch	90–100	....	....	....
3-inch	0–15	90–100	....	....
2-inch	0–5	20–55	....	....
1½-inch	....	0–10	90–100	....
1-inch	....	0–5	30–55	....
¾-inch	....	....	0–20	100
⅜-inch	....	....	0–8	40–65
No. 4	....	....	....	0–3

A typical gradation of a sand sample used in the mix is as follows:

Sieve Size	Per Cent by Weight Retained
No. 4	5
No. 8	17
No. 16	16
No. 30	19
No. 50	21
No. 100	19
Pass No. 100	3
	100

This sand gradation is somewhat coarser than that usually specified. It was necessitated, however, by the unusual amount of grinding or degradation of the rather brittle coarse aggregate during the mixing.

For Allstates Constructors, Inc., John Carson is Quarry Foreman, and C. M. Patterson is Foreman of the Aggregate-Production Plant.

First Annual Award For Concrete Paper

Charles S. Whitney, representing the firm of Ammann & Whitney, consulting engineers of New York and Milwaukee, on July 14 received the first Annual Award of the Concrete Reinforcing Steel Institute "in recognition of a noteworthy contribution to the advancement of reinforced-concrete construction". Whitney received the $500 award on behalf of the firm for its paper entitled "Thin-Shell Concrete Structures". Presentation took place at the 25th Anniversary Meeting of the Institute.

Charles S. Whitney, right, receives the first Annual Award of the Concrete Reinforcing Steel Institute from Henry C. Turner, Jr., President of the Turner Construction Co., New York City. Mr. Whitney accepted the award on behalf of the firm of Ammann & Whitney, Consulting Engineers of New York and Milwaukee, for its paper entitled "Thin-Shell Concrete Structures."

Included in the paper were ten published articles and seven photographs and studies, all relating to a relatively new type of reinforced-concrete shell construction. According to Whitney, the type of shell construction developed by the firm has made possible the use of reinforced concrete for the long-span roofs of such structures as hangars, sports arenas, bus terminals, and large auditoriums—at a much lower cost than has heretofore been possible. Main features are the use of slender, hingeless reinforced-concrete stiffening arches and the placing of the thin shell near the neutral axis of these arches. The use of slender arches reduces the bending and the abutment reactions due to volume changes and abutment displacements. Placing the shell near the neutral axis of the ribs effects considerable economy by reducing by 50 per cent or more the stiffness of the arch rib, with a corresponding reduction in volume-change effects.

To facilitate the construction of these large reinforced-concrete shell roofs, the firm has also worked out the design of a special steel-arch falsework. Although it had not been used at the time the paper was submitted, its estimated first cost is said by Whitney to be considerably less than that of timber falsework.

According to the Institute, interest in the initial competition was gratifying and the quality of entries high. Entries for the 1950 Award are now being invited and it is expected that competition will be keen. Presentation of the 1950 Award will take place at the 26th annual meeting of the Institute at the Shamrock Hotel, Houston, Texas, next summer.

Douglas Jones Represents Chain Belt, Salt Lake City

Chain Belt Co. of Milwaukee, manufacturer of sprocket chains and power transmission machinery, conveyors, and process equipment, announces the appointment of Douglas Jones as Manager of the Salt Lake City District Office. He will operate his business as the Douglas Jones Co. at 1551 Redondo Ave., Salt Lake City, Utah. At present he is Vice President of the Utah Society of Professional Engineers.

Here's LOW COST Concrete Placing
GAR-BRO'S
PORTABLE HOPPERS
Save truck mixer time
• Speed work . . . twin center discharge gates fill twin lines of barrows or carts at same time.
• Frees trucks immediately . . . low height Gar-Bro hoppers can be filled from truck mixer without use of ramps.
• Non-clogging, self-closing gates . . . double clamshell type, 34 inches clearance from ground.
• Self-cleaning, bathtub shape hopper.
For more GAR-BRO information write for Catalog No. 75BC
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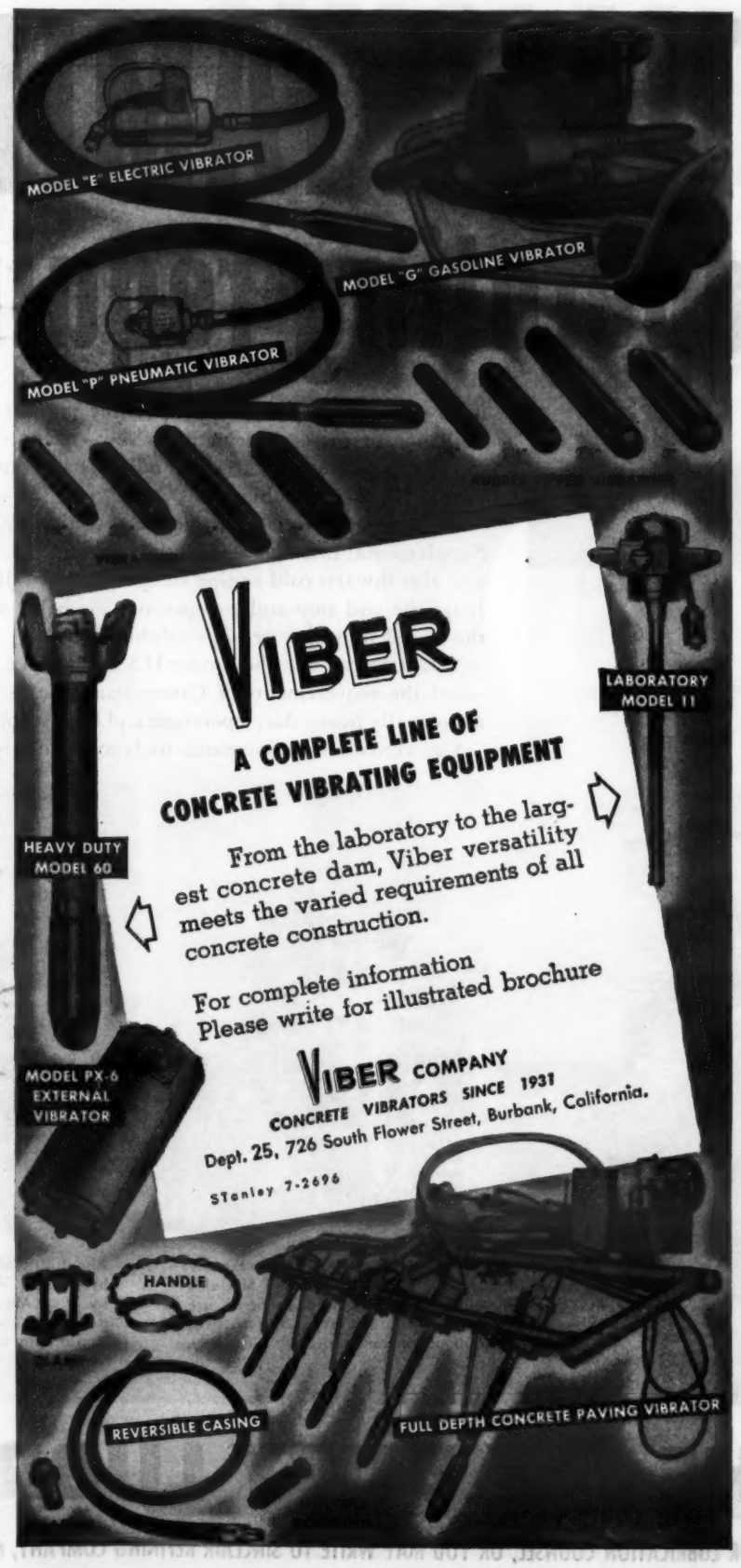
MANUFACTURING COMPANY
2416 E. 16th ST. LOS ANGELES 21
DEALER INQUIRIES INVITED


MODEL "E" ELECTRIC VIBRATOR
MODEL "G" GASOLINE VIBRATOR
MODEL "P" PNEUMATIC VIBRATOR
VIBER
A COMPLETE LINE OF CONCRETE VIBRATING EQUIPMENT
From the laboratory to the largest concrete dam, Viber versatility meets the varied requirements of all concrete construction.
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CONCRETE VIBRATORS SINCE 1937
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LABORATORY MODEL 11
HEAVY DUTY MODEL 60
MODEL PX-6 EXTERNAL VIBRATOR
HANDLE
REVERSIBLE CASING
FULL DEPTH CONCRETE PAVING VIBRATOR

The Grace spreader for hot or cold-mix asphalt or stone base courses is designed especially for widening and close-quarter work.

Spreader Handles Hot Or Cold-Mix Asphalt

A spreader for hot or cold-mix asphalt or stone base courses is a recent addition to the line of equipment made by W. E. Grace Mfg. Co., 6000 S. Lamar St., Dallas 1, Texas. It is designed especially for constructing parking areas and driveways, for widening operations, and for close-quarter work.

The device is drawn by a truck, which dumps its load in the spreader, and travels forward to spread the material. Attachment to almost any make of truck is possible by a hitch clamped to the truck axle. Wheels carrying two 6 x 9 six-ply tires adjust vertically to take part of the load, provide leveling action, and raise the spreader clear of the surface for transporting or backing. The depth of spread may be varied from 1 to 8 inches.

Widths furnished are 7 and 9 feet, but the unit can be blocked to any lesser width. Since not all cold-mixes are spread successfully without an agitator, a traction-driven agitator is available as extra equipment on the 7-foot model and is connected through a clutch to the spreader wheels. It breaks large lumps on cold-mixes and prevents bridging; it also conveys material to the ends of the spreader. The agitator is regular equipment on the 9-foot model, since it is needed for all materials to keep the ends of the machine full. The spreader may be had, on special order, in 4 or 5-foot widths for sidewalks or widening work.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 121.

Reinforced-Concrete Bar; Design Data and Catalog

A 44-page booklet of design data on Webrib bars for reinforced concrete has been issued by Webrib Steel Corp., 120 Broadway, New York 5, N. Y. The booklet's contents include: general information on the Webrib bar and its development, notations, and explanations with examples of the design tables that comprise the major portion of the booklet. Some of the tables are specifically for application to the Webrib bars; others compare Webrib with standard bars, or may be used for either. The price of the booklet is $2.00.

In addition to the booklet, data concerning the features and the complete specifications for Webrib concrete-reinforcement bars are available.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 138.

Air Reduction Changes

The Air Reduction Sales Co., New York City, recently made the following sales personnel changes: J. B. Davenport, formerly Assistant Manager of the Detroit district, has been appointed Assistant Manager of the Charlotte district; J. H. Hart, formerly Assistant Sales Manager at Detroit, has been promoted to Assistant Manager of the district; R. A. Jamieson succeeds Mr. Hart in Detroit; A. S. Blodget, Jr., has been made Assistant Manager of the Boston district.

New Hydraulic Dozer

A new Bros hydraulic straight dozer designed for International TD-14 wide-gage tractors has recently been introduced by the Wm. Bros Boiler & Mfg. Co., 1057 Tenth Ave., S. E., Minneapolis, Minn. Completely tractor-main-frame-mounted, it provides a standard-gage blade for a wide-gage tractor and makes possible full utilization of tractor power without overloading, the company says.

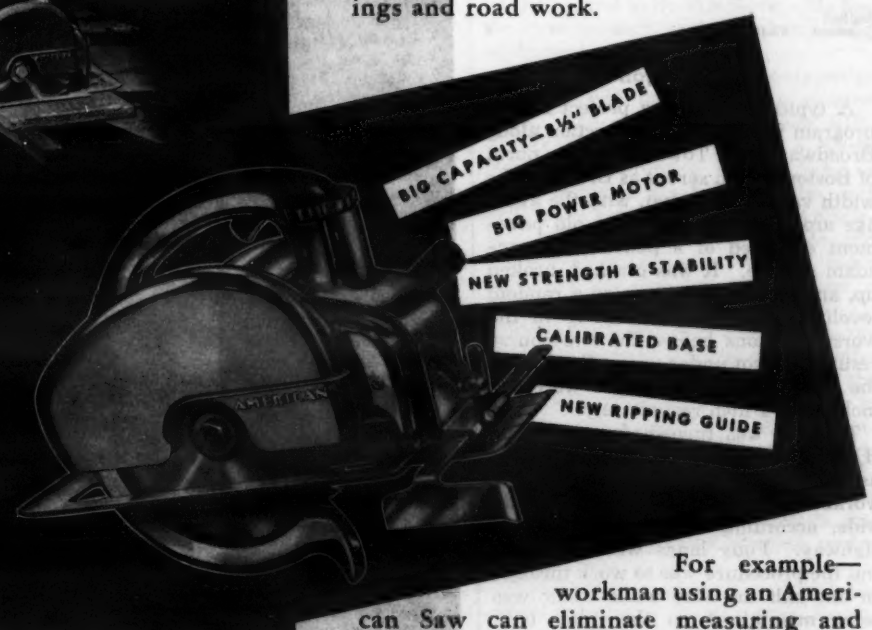
The dozer blade is held secure in any position because the holding force of the hydraulic ram is applied directly to the blade. The company states that this direct application of power eliminates the necessity of the heavy-beam type of structure. The dozer design, as may be seen from the accompanying photograph, is simple. The view is clear on all sides and the rear of the tractor is entirely clear for winch mounting, rear power take-off, or alteration of the tractor drawbar.

The new Bros Power-Plus straight dozer is designed for International TD-14 wide-gage tractors. Simple design permits clear view, the company says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 127.

SPEED FORM WORK WITH AMERICAN SAW

Cut rough forming time—use this big power, big capacity AMERICAN Saw! Many times faster than hand sawing. Especially fast for concrete form work in heavy construction such as bridges, buildings and road work.



For example—workman using an American Saw can eliminate measuring and marking for many cuts, by using the saw's calibrated base for ripping. Power to spare for all-around work . . . G.E. motor develops 2⅛ H.P. . . . zips right through wood, stone, tile, sheet metal, compositions. Will cut a 2⅛" plank at 45°, or 3" straight cut. Holds accurate depth of cut and angle adjustment. No jolt—no twist when starting . . . balanced torque principle. Precision-built . . . sturdy for long life. Send coupon for details.

The American Floor Surfacing Machine Co.
558 So. St. Clair St., Toledo 3, Ohio

☐ Please send illustrated bulletin and price on new American Power Saw. No obligation.

☐ Please arrange a FREE demonstration of the new American Power Saw. No obligation.

Name.....

Street.....

City.....State.....

SINCE 1903
AMERICAN
PORTABLE TOOLS

Black-Top Laid Through Suburb

Typical Chapter 90 Job In Massachusetts Is Done Both With Contract and Force-Account Labor

✦ IN the Commonwealth of Massachusetts, Chapter 90 of the state highway law pertains to the improvement of roads whereby part of the cost is borne by the State, and the remainder by the county and the local municipality—town, village, or city. The State Department of Public Works exercises general supervision over such reconstruction. Regarding black-top work, state Type I bituminous concrete is generally used on resurfacing projects. The mix is purchased from the asphalt company submitting the lowest bid on the material required for each project. Personnel includes equipment operators supplied by the asphalt company, while the common labor is force-account furnished by the municipality.

Two courses of black-top are laid, with a total minimum thickness of 2¼ inches; the bottom course is 1¼ inches while the top course is 1 inch. The general composition of the mixture for the bottom and top courses, with the gradation of the coarse aggregate, fine aggregate, and mineral filler, is as follows:

Sieve Size		Per Cent by Weight			
Passing	Retained	Bottom Course		Top Course	
		Min.	Max.	Min.	Max.
1-inch	....	100	....	....	....
1-inch	¾-inch	0	10	....	....
¾-inch	½-inch	35	65	....	....
½-inch	....	....	....	100	....
½-inch	No. 4	10	30	20	60
No. 4	No. 10	5	15	10	35
No. 10	....	15	30	30	45
No. 10	No. 20	2	10	4	15
No. 20	No. 40	2	8	4	16
No. 40	No. 80	2	10	6	20
No. 80	No. 200	1	6	5	16
No. 200	....	1	6	4	9
Asphalt cement	85-100	4	6	5	8

Typical Job

A typical resurfacing project in this program was a 5,500-foot section along Broadway in the Town of Malden, north of Boston, which serves as U. S. 1. The width varied somewhat, with the average around 44 feet, and the old pavement consisted of a penetration-macadam surface. It was cracked, broken up, and uneven in places, so a random leveling course was laid down in the worse locations before the two-course resurfacing got under way. On this job the bottom and top courses were 1½ inches and 1 inch respectively.

The mix was furnished and laid by H. H. McGuire & Co. of Malden, Mass., using an Adnun Black Top Paver which worked in lanes from 10½ to 12 feet wide, according to the width of the highway. Four lanes were required, and the procedure was to work through on one half the road while traffic was being maintained on the other half. Then the completed half was opened while the other half was closed for resurfacing. The job started October 6, 1948, and was finished by November 1.

As the asphalt plant was only a 2-mile haul from the job, four trucks carrying 13 tons each of hot-mix were sufficient to keep the paver in material. Two Buffalo-Springfield 10-ton tandem rollers compacted the black-top. One of the rollers was owned by the asphalt supplier, along with the paver, while the other roller belonged to the City of Malden. The City also supplied all the labor for the job with the exception of the paver operator and the one roller man operating the asphalt company's roller. The paving crew consisted of two rakers and eight laborers, in addition to the equipment operators and supervisory personnel.

Before any black-top was laid, the old penetration-macadam surface was first given a light painting of asphalt emulsion, about 0.05 gallon to the square yard. A cobwebbing application was applied with a broom dipped into a drum of the bitumen. Following this tack coat the bottom course was laid for a distance of from 500 to 700 feet, and then covered with the top course until the entire first lane was completed. Work proceeded from the center of the pavement to the edges. The edges required special attention from the rakers in feathering out at the curbs or along the shoulders.

Personnel

H. H. McGuire & Co. had Edward Sildiker for Foreman, while the City of Malden's Foreman was Tom Keefe. Samuel Slater handled the engineering for the City of Malden. For the Massachusetts Department of Public Works, Leon Beytes was Engineering Inspector. The Department is headed by William F. Callahan, Commissioner, with Philip H. Kitfield, Chief Engineer.

Hercules Manager Changes

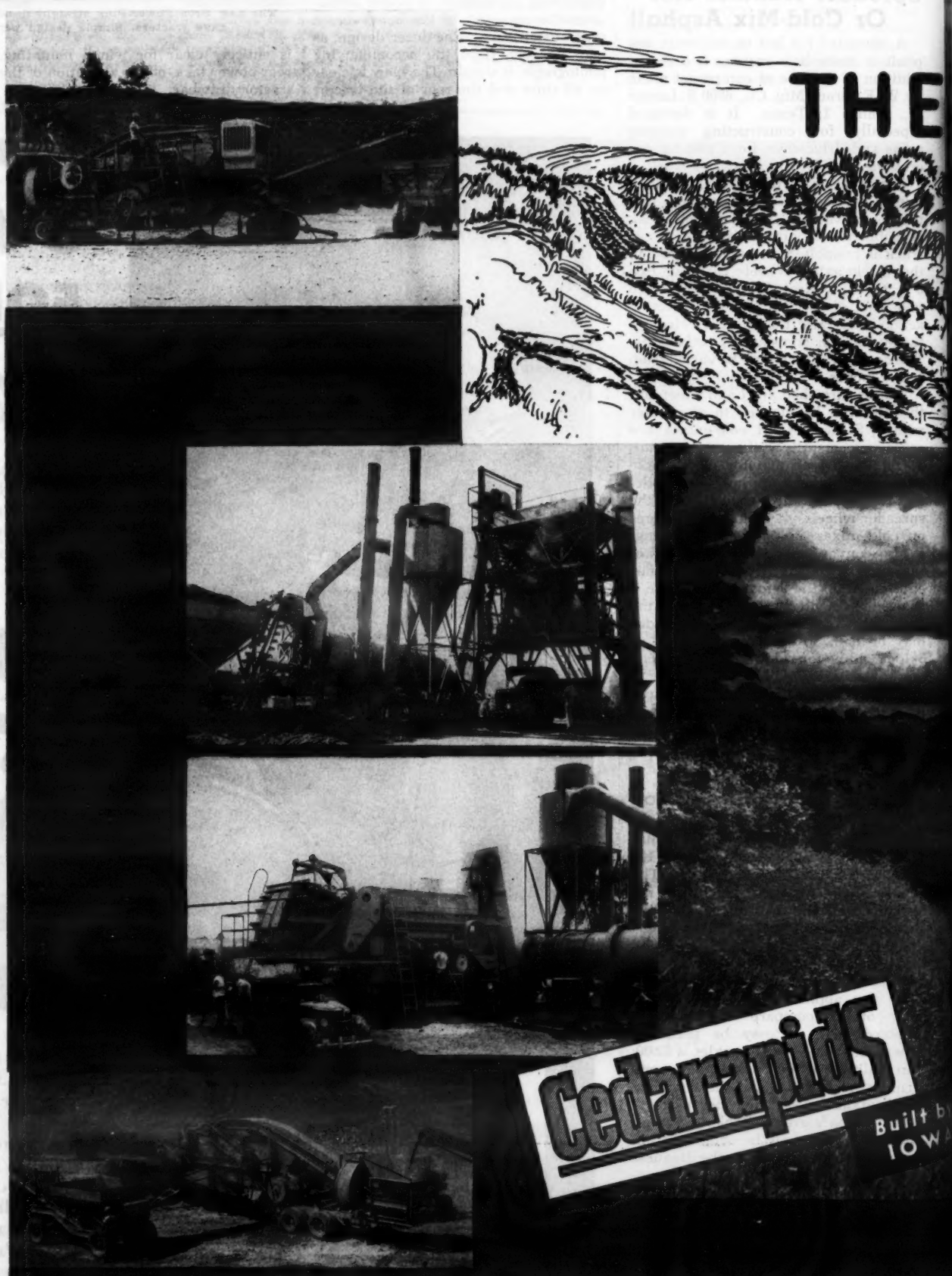
Two promotions in the Explosives Department of Hercules Powder Co., Wilmington, Del., have been announced: J. J. Kelleher has been named Assistant Sales Manager, a newly created post, and L. C. LeBron has been appointed to succeed Mr. Kelleher as Manager of the Contractors Division.

Absorbs Spillings Of Grease and Oil

A new low-cost oil and grease absorbent, Penn Drake Kwixorb, is now being offered by Pennsylvania Refining Co., 2686 Lisbon Road, Cleveland 4, Ohio. Kwixorb is a granular material designed for quick and easy removal of oil, grease, gasoline, and kerosene spillings.

The material is non-inflammable and, even when saturated with oil, will not support combustion. Being inert, it is unaffected by acids and alkalis. It will help reduce slipping and fire hazards where spillings are common.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 34.



Catalogs on Snow Plows And Maintainer Units

Two illustrated folders, one on the Oliver-Henke maintainer unit and one on Henke snow plows, have been released by the Henke Mfg. Corp., 100 Main St., Janesville, Iowa.

The maintainer is designed to meet the road-maintenance requirements of city, county, and state highway departments. The catalog describes the unit's rugged construction, hydraulic controls, blade-angle adjustments, leaning wheels, hydraulic steering, hydraulic scarifier, and snow-plow attachment. It also notes that the tractor can be readily removed from the unit for use on other work. Specifications and drawings of component parts are included in the folder.

The second catalog presents the Henke V-type and the straight-blade snow plows. It lists specifications and illustrates the principal features of these plows.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 8.

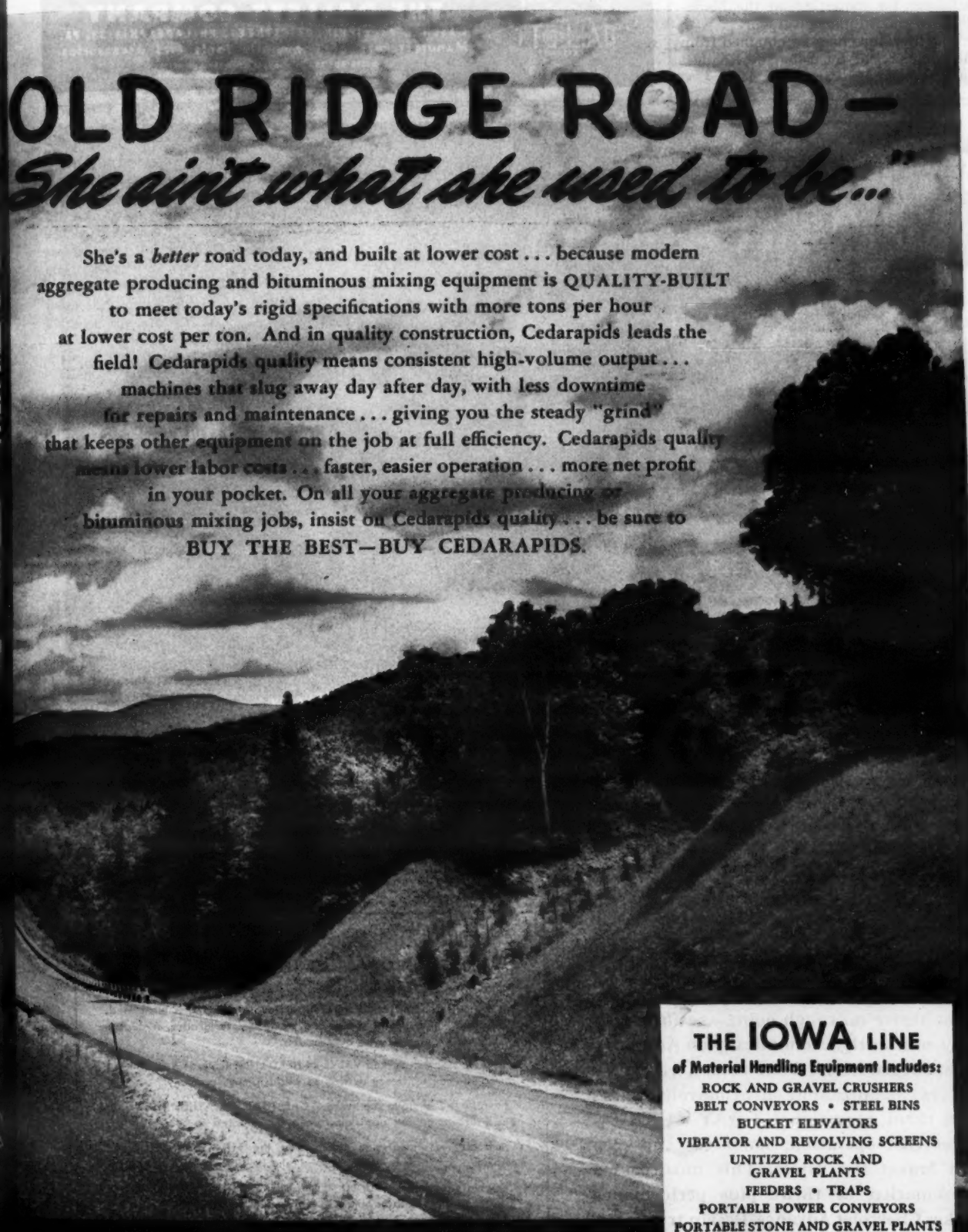
Folder on Rolling Hoists

A catalog on the CMC Roll-O-Hoist material elevator is available from the Construction Machinery Sales Co. of Waterloo, Iowa. The folder explains that this portable hoist is easily set up and moved from place to place as the job progresses.

Complete specifications for three models are listed. Model A has a capacity of 500 pounds at 45 fpm; Models C and D, 500 pounds at 90 fpm or 1,000 pounds at 45 fpm. The maximum unloading heights without extensions are 16 feet for A and C, and 25 feet for D. Model A will take one 10-foot extension and C and D will take three each.

The bulletin points out that all models can be obtained, if desired, with gasoline-engine drive instead of electric-motor drive. Remote-control attachments permit the CMC Roll-O-Hoist to be operated from any level. Also, automatic stops make it possible to load or unload at intermediate levels without having to employ an operator.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 19.


OLD RIDGE ROAD—
She ain't what she used to be..."
She's a better road today, and built at lower cost . . . because modern aggregate producing and bituminous mixing equipment is QUALITY-BUILT to meet today's rigid specifications with more tons per hour at lower cost per ton. And in quality construction, Cedarapids leads the field! Cedarapids quality means consistent high-volume output . . . machines that slug away day after day, with less downtime for repairs and maintenance . . . giving you the steady "grind" that keeps other equipment on the job at full efficiency. Cedarapids quality means lower labor costs . . . faster, easier operation . . . more net profit in your pocket. On all your aggregate producing or bituminous mixing jobs, insist on Cedarapids quality . . . be sure to BUY THE BEST—BUY CEDARAPIDS.
THE IOWA LINE
of Material Handling Equipment Includes:
ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS • STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING SCREENS
UNITIZED ROCK AND GRAVEL PLANTS
FEEDERS • TRAPS
PORTABLE POWER CONVEYORS
PORTABLE STONE AND GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE AND VOLUMETRIC TYPE ASPHALT PLANTS
HAMMERMILLS
DRAG SCRAPER TANKS
WASHING PLANTS
SOIL COMPACTION UNITS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS

Headquarters Shop Repairs Equipment

Central Garage Houses Shop, Spare Parts, and Service Equipment for Highway Machines

✦ THE headquarters repair shop and garage for the Missouri State Highway Department in Jefferson City, Mo., is a model of neatness, efficiency, and order. In addition to its function as a repair garage and warehouse for the entire statewide parts stock, it is also a division garage for the highway activities which center around the capital city.

Located near the west side of the city not very far from the state capital, the headquarters building for the garage is a large masonry structure about 325 x 80 feet in size. Part of the building is two-story; part has three stories. It houses all of the State Highway Department records of the past, among other things. The Highway Department photographer maintains his office and darkroom in the building.

To speed the repair of all state highway equipment, the building contains about 5,000 different stock items worth about $300,000. These parts are arranged in neat bins, are cataloged on stockroom cards, and can be found at a moment's notice.

The equipment-repair divisions of the garage consist of a main automotive repair and service shop, a machine shop, a blacksmith shop, generator and electrical shop, a paint room, stockroom, and various storehouses. One division of the warehouse contains many hundreds of tires.

All magneto, generator, starter, and other such electrical work is done in the headquarters shop for equipment all over the state. A skilled technician is on the payroll to do that work. He has the most modern testing and adjusting equipment money can buy.

The machine shop, too, is equipped to turn out odd parts or more routine work. The shop has a 12-inch Hill-Clarke lathe, a Niles planer, a South Bend and a Prentice 18-inch lathe, a Heald cylinder grinder, an Atlas post drill, a Becker milling machine, a Kwik-Way turning and grinding machine, and a Peerless power saw. All of these machines are flat-belt-driven from a 25-hp electric motor.

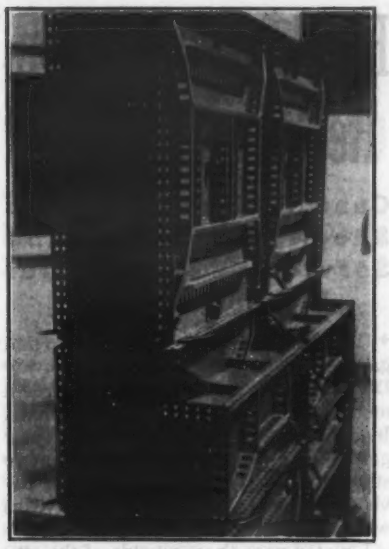
Up in the automotive shop, where repairs are made to the many automobiles and trucks, the mechanics have the most complete automotive tool kits in the city. The shop has an 80-ton Manley hydraulic press, a Bear wheel balancer, a Black & Decker 10-inch grinder, two Marquette electric welders, a monorail with two service hoists, and complete oxyacetylene welding equipment.

The shop is equipped to fulfill the prime purpose of the Bureau of Equipment: that of keeping all equipment operating.

Stop Air-Line Freezing

The Tanner and Frosto systems for preventing air-line freezing are featured in a 4-page catalog issued by Joy Mfg. Co., Oliver Bldg., Pittsburgh 22, Pa. The Tanner systems, the catalog explains, are scientific and economical cures for winter-time freeze-ups of air lines and equipment. The Frosto system is recommended by Joy wherever air-compressor installations are permanent and electric current is available. The folder describes and illustrates the Frosto vaporizer and the Tanner tank.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 52.



To its regular steel form system for concrete construction, Economy Forms Corp. has added a plate to form offsets for brick or stone seats.

Steel Form System Adds Offset Plate

The Economy Forms Corp., P. O. Box 128, H.P. Station, Des Moines 13, Iowa, has added to its regular steel form system a plate to form offsets for brick or stone seats. It is designed to eliminate the problem of filling in for this offset and supporting the forms above the offset.

The Economy forms are available in various sizes to enable contractors to form inside and outside corners as well as pilasters or wall columns. The new plate makes a 5-inch offset which, the company says, will meet most requirements.

Further information on this plate or the entire system of Economy steel forms may be secured from the company. Or use the Request Card at page 16. Circle No. 24.

Flameproofed Canvas

A flameproofed and waterproofed canvas called FlameZel has been developed by the Chemical Research Division of H. Wenzel Tent & Duck Co., 1037 Paul St., St. Louis, Mo. It is suitable for a variety of uses: building construction windbreaks, material and equipment covers, tents, and tarpaulins for trucks. The company's formula for flameproofing makes use entirely of domestic chemical ingredients.

FlameZel is guaranteed to meet the fire-resistant requirements of Federal Specification CCC-D-746. Packaged for ease of handling and storage and for positive identification, FlameZel tarpaulins will be available after October 1, 1949, through wholesale construction-equipment distributors in all principal cities.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 155.

Gear-Selection Indicator

A small pocket-size gear-selection indicator for the rubber-tired Tournadozer is available from R. G. LeTourneau, Inc., of Peoria 1, Ill. It shows how the air selector valve on the Tournadozer chooses the proper gearing without clutch manipulation by the operator. It also pictures the Tournamatic constant-mesh transmission and synchronous multiple-disk clutches.

This indicator is available from the company, or by using the Request Card at page 16. Circle No. 47.

Euclid Promotes McDonald

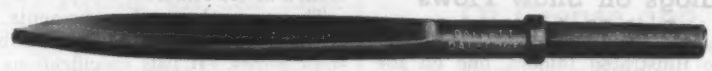
Paul A. McDonald was promoted to the position of District Manager of the Euclid Road Machinery Co., Cleveland, Ohio, succeeding J. W. Bloomquist who recently became Assistant Sales Manager. Mr. McDonald will represent Euclid in North and South Dakota, Minnesota, upper Michigan, and parts of Iowa and Wisconsin. The company branch office in Hibbing, which serves the Iron Range, remains in charge of J. R. Blackburn.

Snow Plow for Grader

Bulletin No. B, describing the Model 8 V-type snow plow for attachment to the PG-10 power grader, has been issued by Meili-Blumberg Corp. of New Holstein, Wis. This plow has a cutting width of 7½ feet, and a height of 2 feet 7 inches at the nose and 5 feet at the outer edge. Complete specifications, a list of extra attachments, and photographs of the plow attached to the grader are included.

On the reverse side of the bulletin, information is given on a hydraulic bulldozer for mounting on the Meili-Blumberg PG-10 power grader.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 44.



The Dallett Dal-edge Moil Point

By employing the practical wedge principle to the Dal-edge Moil Point Dallett gives you a tool that will break pavement and concrete with greater efficiency than was ever possible to obtain with conventionally designed Moil Points.

Wedge Design Spreads Fracture Easier — Quicker

From the moment the point of the tool enters the concrete, wedge design progressively widens the fracture as power is applied. The wider part of the tool shatters the penetrated area. Forged by Master Craftsmen, Dal-edge Moil Points have the tradition of 66 years of Quality Toolmaking behind them.

Send for Dallett Bulletin C-220

TOOL MAKERS PNEUMATIC DALLETT ACCESSORIES SINCE 1883

THE DALLETT COMPANY
MASCHER AT LIPPINCOTT STREET, PHILADELPHIA 33, PA.
Manufacturers of Pneumatic Tools and Accessories
DISTRIBUTORS in principal cities throughout the United States, Canada, Europe and South America.

Reliability plus Road-Ability . . .

CHEVROLET ADVANCE-DESIGN TRUCKS

CHEVROLET Chevrolet Advance-Design trucks have what it takes to deliver your goods swiftly, safely, surely—under the most adverse driving conditions. They thrive on rough going—perform reliably, efficiently, economically on America's most rugged roads. What's more, wise truck buyers recognize that only Chevrolet trucks give them sensational 3-WAY THRIFT—lower cost operation, lower cost up-keep and lowest list prices. This unsurpassed combination of thrift plus performance makes Chevrolet Advance-Design trucks top favorites across the nation . . . outselling the next two makes combined. For further details see your Chevrolet dealer without delay.

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT 2, MICHIGAN

TOP-VOLUME PRODUCTION BRINGS YOU TOP-VALUE FEATURES!

Chevrolet's new 4-SPEED SYNCHRO-MESH TRANSMISSION offers quicker, quieter and easier operation. Double clutching is eliminated. Faster shifting maintains speed and momentum on grades. Available in series 3800 and heavier duty models.

Chevrolet's power-packed VALVE-IN-HEAD ENGINES provide improved durability and efficiency as well as world-famous economy!

Chevrolet trucks have the famous CAB THAT "BREATHES"*! Outside air is drawn in and used air forced out! Heated in cold weather.

Chevrolet Advance-Design brings you the FLEXI-MOUNTED CAB, cushioned on rubber against road shocks, torsion and vibration.

Chevrolet's exclusive SPLINED REAR AXLE HUB CONNECTION adds greater strength and durability to heavy-duty models.

Unitweld, all-steel Cab Construction • Large, Durable, Fully-Adjustable Seat • All-Round Visibility with Rear-Corner Windows* • Heavier Springs • Super-Strength Frames • Full-Floating Hypoid Rear Axle in the 3600 Series and Heavier Duty Models • Double-Articulated Brake Shoe Linkage • Hydrovac Power Brakes in Series 5000 and 6000 Models • Many Color Options.

**Heating and ventilating system and rear-corner windows with de luxe equipment optional at extra cost.*

CHOOSE CHEVROLET TRUCKS FOR TRANSPORTATION UNLIMITED!

There are no bolts to unscrew, pull out, and lose on the improved Champion snatch block, No. 422.

A New Snatch Block

McKissick Products Corp., P. O. Box 2496, Tulsa, Okla., has brought out a new and improved Champion snatch block, No. 422. It features the patented Speed Nut, said to eliminate all lower bolts and greatly facilitate opening and closing of the block. The block is available in 6, 8, and 10-inch sheaves with ultimate hook capacities from 92,000 to 96,000 pounds. Drop-forged selected steels are used throughout in its construction.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 3.

Spreader and Feeder

Recent catalogs on the W-K spreader and feeder are available from the W-K Mfg. Co. of Plain City, Ohio. They point out that the spreader will replace the tail-gate on any dump truck; that it is readily attached and detached without alteration to the motor-truck body. A width of spread of 8 to 50 feet is controlled exclusively by the driver. The spreader is driven by the power take-off of the truck engine. These spreaders find use for surface treating, correcting bleeding highways, and ice control.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 69.

New Armco Steel Plant

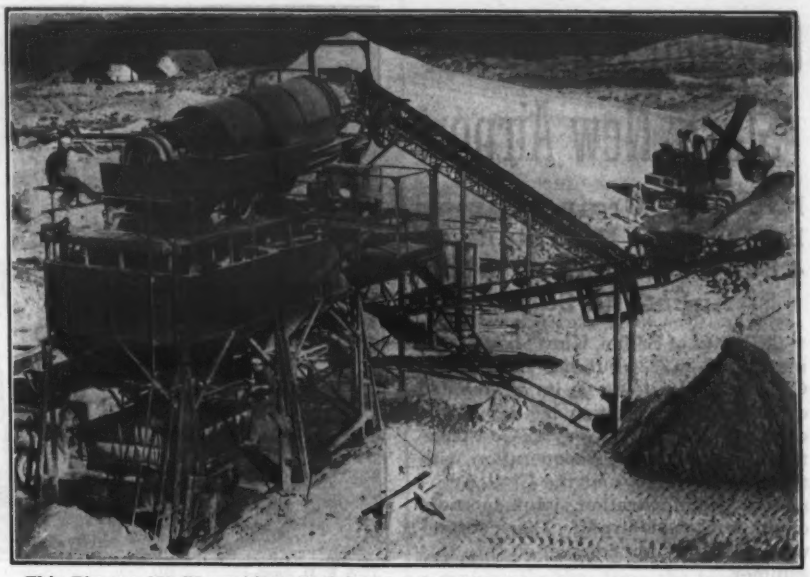
Immediate construction of a new $12,000,000 steel-making plant which can produce 400,000 tons of steel ingots per year has been authorized by the Armco Steel Corp. It will be built just south of Armco's big East Works plant in Middletown, Ohio. This new plant will consist of three 225-ton open-hearth furnaces of the latest design, together with several miles of railroad tracks, pipe lines, high-tension lines, and other equipment necessary to operate the plant. This major expansion is a result of a constant growth of steel consumption in the area.

Construction of the new plant has been started. More than 500,000 cubic yards of slag must be moved before the work of pouring 12,000 cubic yards of concrete for the foundations can proceed. Some 7,000 tons of structural steel will be needed to erect the 200 x 700-foot main building. It is estimated that the construction will take 15 months.

Washed Aggregates Supplied by Plant

A new Pioneer 305-W washing plant is used by Baraboo Concrete Products Co. of Baraboo, Wis., to supply washed aggregates for a ready-mix fleet and concrete-block plant. The washing plant is all-electric powered and main units are: an 18-inch x 70-foot feeder conveyor with a 24-inch reciprocating plate feeder, a 42-inch x 21-foot 8-inch revolving screen, two 21-cubic-yard storage bins, a 32-inch and a 48-inch dehydrator. Production runs 350 to 400 cubic yards of sand and 110 to 200 cubic yards of sized gravel a day.

Further information on this aggregate-washing plant may be secured from Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn., or by using the Request Card at page 16. Circle No. 38.



This Pioneer 305-W washing plant turns out 350 to 400 cubic yards of sand and 110 to 200 cubic yards of sized gravel a day for Baraboo Concrete Products Co., of Baraboo, Wis. It is all-electric powered.

WE CAN INCREASE YOUR YARDAGE 50 TO 100%

It's a Guarantee

Type of Bucket	Load Time	Dump Time	Jockeying Time	Total Time	Full Loads Each Trip
AUTOMATIC	3 to 7 sec.	2 to 4 sec.	0 sec.	5 to 11 sec.	100%
Ordinary Type	7 to 16 sec.	4 to 7 sec.	2 to 6 sec.	13 to 29 sec.	85%

THESE are the facts proven by numerous tests made recently between the Page AUTOMATIC and ordinary type buckets, using all sizes from ⅜ to 30 cu. yd. in various types of digging conditions.

The AUTOMATIC always gets a full load within 1 to 2 bucket lengths and can be picked up immediately without spilling while ordinary buckets have to be pulled at least 4 to 6 bucket lengths to get and hold their loads. Another point about the AUTOMATIC—it is always the correct weight for maximum digging efficiency. "Light-weight" buckets of larger "rated" capacity cannot match the profit-making ability of a Page. For more yardage per day, lower power costs and minimum maintenance, be sure your next dragline bucket is a Page AUTOMATIC.

9 cu. yd. AUTOMATIC on a Page Model 625 Dual Diesel Walking Dragline with 150' boom.

GET THE FACTS TODAY

Call or write for details on how to make a time study with your own stop-watch for positive proof—or better still, ask for a Page engineer to call and prove these facts without any obligation.

25 to 45% less power required for day-after-day operation because the AUTOMATIC loads, dumps and handles faster.

Less maintenance because the AUTOMATIC is not worn out through excessive dragging to get its load.

The AUTOMATIC always lands in digging position, digs in at first pull on the load line and never produces windrows.

Send for Bulletin 2049

PAGE Automatic

DRAGLINE BUCKETS and WALKING DRAGLINES

PAGE ENGINEERING COMPANY

Clearing Post Office • Chicago 38, Illinois

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We will buy or trade in old Transits, Levels, Alidades, etc. Send instruments for valuation.

Write for new Catalog CE-99 of Engineering Instruments, Engineering Field Equipment and Drafting Room supplies.

WARREN-KNIGHT CO.

Mfrs. of Sterling Transits & Levels

136 N. 12th St. • Philadelphia, Pa.

Grading Equipment Starts New Airport

Midwest Grain Capital Builds New Main Runway 4,800 Feet Long to Draw Airlines to Salina

✦ THE city of Salina, Kans., has a population of 26,222, but has had only a Class I airport to serve its air-minded citizens. That situation has now been corrected by the H. J. Taylor Construction Co. of Salina, in cooperation with the City of Salina and the Civil Aeronautics Administration, joint sponsors of an improved airport. This contract was scheduled for completion late this summer.

The new terminal is designed to draw the commercial airlines to Salina. It is expected that Continental Airlines will start furnishing passenger service immediately.

Taylor's contract called for the construction of a main N-S runway 4,800 x 100 feet; three taxiways, 1,800, 450, and 650 feet long, and from 40 to 50 feet wide; and a small warm-up apron. The field was left shaped for future development as the need arises.

Specifications called for 95 per cent of modified AASHO density in the compacted subgrade. They also called for 5 inches of granular sub-base, composed principally of river-bottom sand with a PI of 0 to 6. A concrete slab 8 inches thick tops this sub-base. It is reinforced at the ends, taxiways, and intersections, and plain otherwise.

The finished grading under this contract was seeded with a mixture of brome, clover, and red-top outside the paved areas, and the 0.75-foot crown of the standard paved sections will pitch rain water to drain structures at the sides. There are also some warped drain sections to tie in to the future development.

Grading Subcontract Let

All the grading was subbed to the Emporia, Kans., contracting firm of T. F. Marbut. Marbut moved in November 15, 1948, and successfully operated most of his equipment through the winter. Bad weather and ground water last spring made his part of the project very difficult.

Marbut's grading-equipment fleet included a Northwest 80-D shovel, three 14-cubic-yard Euclid end-dump trucks, a D8 Caterpillar tractor with a 16-cubic-yard LaPlant-Choate Carrimor scraper, another D8 with a Caterpillar scraper of the same size, and two Caterpillar DW10's with scrapers. A D8 tractor with a bulldozer blade, a No. 12 motor grader, one pull blade, three Gebhard sheepsfoot tamping rollers, and a K-30 LeTourneau Rooter completed the picture.

The grading work lay generally on the top of a natural plateau about 1½ miles southeast of Salina. Soil here consisted principally of sticky clay and gumbo. It dug easily enough but it was tough to process and roll.

There were some 310,000 cubic yards of grading in the project, and the average haul distance was 2,000 feet. Part of this material lay in cut sections; part required fills. The deepest cut was 16½ feet, while the highest fill was 24 feet. It lay across a natural gully.

Excavated earth was separated; the fine black topsoil stockpiled for use later on. Regular material unsuitable for the topsoil classification was sent to the fills, where it was spread in 6-inch lifts. No water was necessary on the airport because the material contained so much natural ground moisture, but it was sometimes so spotty that uniformly high densities were difficult to obtain.

C. & E. M. Photo
On the Salina, Kans., Airport job, Resident Engineer V. E. Richardson runs a K&E level for cross-sectioning, as G. E. Goucher, Foreman for T. F. Marbut, looks on.

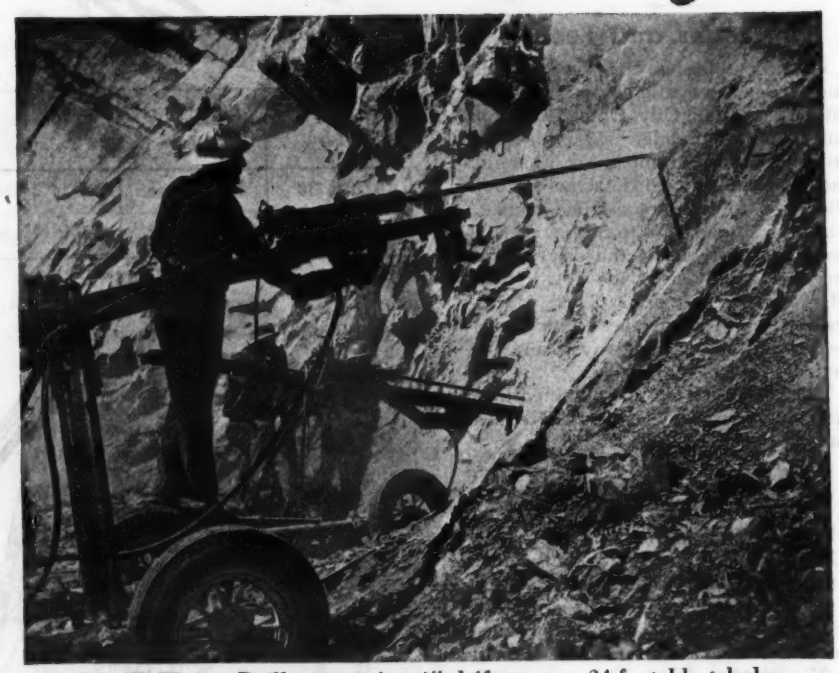
G. E. Goucher, Foreman, and Ed Brasfield, Superintendent, of the Marbut organization developed the "Goucher and Brasfield Special", a blending tool for mixing the earth and breaking up the clods. The tool consisted basically of a 16-foot steel bar, fastened to the rear frame of the LeTourneau K-30 Rooter. Scarifier teeth from a Caterpillar motor grader were then fastened to this bar, and the large ripper teeth removed from the K-30. Hooked on behind a tractor, the rig did good work.

Compaction was so difficult that the three heavy sections of Gebhard rollers worked 24 hours a day keeping up with dirt the grading fleet dumped in a 10-hour shift. According to Resident Engineer V. E. Richardson of the Murray A. Wilson Co., Engineers and Architects, of Salina, some of the dirt required as many as 45 roller passes, and 30 passes was average.

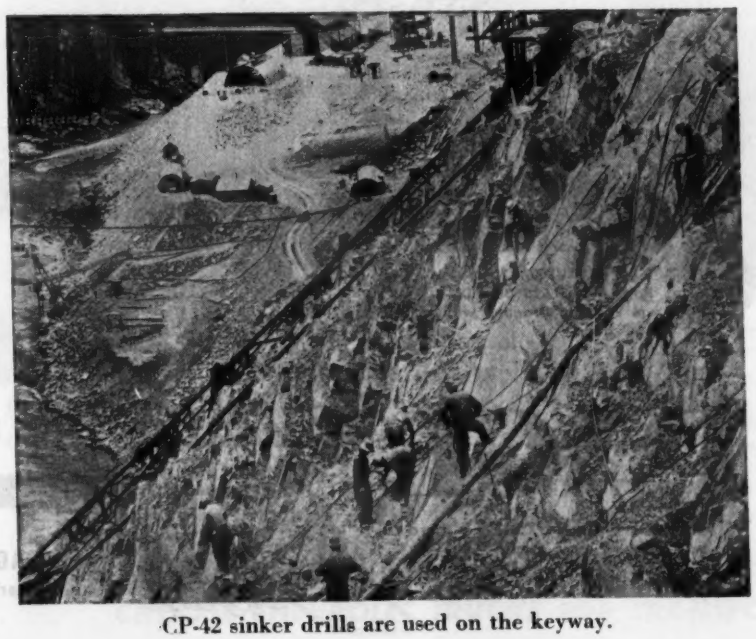
(*Concluded on next page*)

CP at Hungry

CP rock drills at Hungry Horse



G-200R Wagon Drills, mounting 4″ drifters, run 24-foot blast holes.



CP-42 sinker drills are used on the keyway.

A battery of CP-55 Diamond Drills is employed for blast hole drilling in the spillway tunnel – 955 feet through solid rock. CP-55 Diamond Drills are also used for blast hole drilling of the keyway area.

Grading Equipment Starts New Airport

(*Continued from preceding page*)

Rain complicated the excavation, too. During the spring of 1949 there were more rainy days than many an old-time resident around Salina can remember. There was just one thing to do when it got too bad: stop work. Despite all this, however, the equipment moved 115,000 cubic yards during March, working one 10-hour shift per day.

The finished subgrade was cross-sectioned and blue-topped with survey hubs as the fill neared its final height. When Marbut's men and equipment finished the grading subcontract, they left the runway so smooth that several planes had already used the runway on Sunday before grading was formally accepted. One private plane, trying a tricky take-off, cracked up on the stockpile of topsoil, fortunately without killing any of its three occupants. The plane, however, was badly wrecked.

C. & E. M. Photo
Three sections of Gebhard rollers behind a D8 compact fill at the Salina Airport.

Sub-Base and Concrete

The sand sub-base and portland-cement concrete paving features of the new airport had not been started when this article was written, but preparations had been completed and the work was pretty well planned. Salina Sand Co. furnished and hauled the sand sub-base material, delivering it to the field. There it was spread to a uniform thickness of 5 inches, and rolled by a 3-wheel steel roller.

Since the whole airport contains less concrete than approximately 5 miles of standard Kansas highway, Taylor planned to use only what highway paving equipment he had on hand. No new machines were purchased for this contract.

Sand for the concrete mix came in from Sterling, Kans., because local Salina sand was too low in No. 50 and No. 100 sizes to meet the specifications. Rock aggregates were shipped in from the commercial plant of Quartzite Stone Co., at Lincoln, Kans. Two kinds of cement, Ash Grove and Atlas, were used.

Taylor made his pours in 20-foot strips. He had an ample supply of 9-inch Heltzel road forms on hand, a Rex 27-E concrete paver, and a Jaeger-Lakewood finisher with vibrators. This equipment placed the concrete. It was finished by floats behind the Jaeger-Lakewood machine, and given a pulled-belt diagonal finish. A membrane cure was used.

According to Taylor, the paving part of the project was expected to go rapidly, and by late summer the gleaming white runway and taxiways were a reality. By that time the topsoil was spread, the ground seeded, and equipment left as suddenly as it appeared.

Salina citizens now find that theirs is another American city which is hooked to this country's chain of constantly expanding air terminals. The big planes—and the new terminal can take 60,000-pound wheel loads—are able to land without extensive circling, for it is a pilot's airport.

Low-Cost Salt Storage For Snow-Removal Work

Many highway departments which rely on rock salt for snow and ice removal have developed low-cost storage facilities in their communities, according to a study of the problem made by International Salt Co., Inc., of Scranton, Pa. Unused buildings or parts of buildings, open sheds, and storage out-of-doors have all been used satisfactorily to store rock salt in bulk or in bags, the study revealed.

In recent years, a growing number of departments have stored large quantities of rock salt in the autumn as a reserve supply, and used it as insurance against a hard winter and the interruptions in deliveries that occur when major storms hit a wide area. In selecting storage locations, they look for unused buildings and sheds, or portions of them. When these are not available, however, rock salt, either in bulk or in bags, may be stacked against a garage or shed wall, put in open bins, or stored completely in the open, either on the ground or, preferably, on a raised platform. When it is placed in the open in this way, rock salt is generally covered with a tarpaulin.

International Salt Co., Inc., has prepared a pamphlet outlining methods of rock-salt storage that are now widely used throughout the northern states. The pamphlet, "How to Provide Low-Cost Rock-Salt Storage", also contains engineering data concerning the weight and bulk of rock salt loose and in bags, information about the proper construction of bin bottoms, and similar data to guide highway departments in selecting suitable storage locations.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 156.

Truck Service Tools

Helpful hints for owners of FWD trucks are illustrated and described in the new Bulletin, No. FWD-49, issued by the Owatonna Tool Co., 348 Cedar St., Owatonna, Minn. They tell how to remove and install gears, bearings, shafts, pulleys, skeins, sprockets, collars, flanges, pinions, bearing outer races, and other tight-fitting parts. OTC pullers and other tools shown in the catalog can also be used on other makes of trucks and equipment.

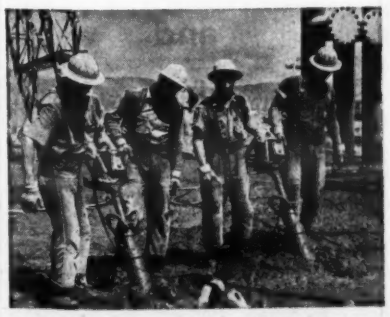
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 99.

Horse

HUNGRY HORSE DAM—
gigantic irrigation and hydroelectric project is being built with CP equipment

CP Pneumatic Winch

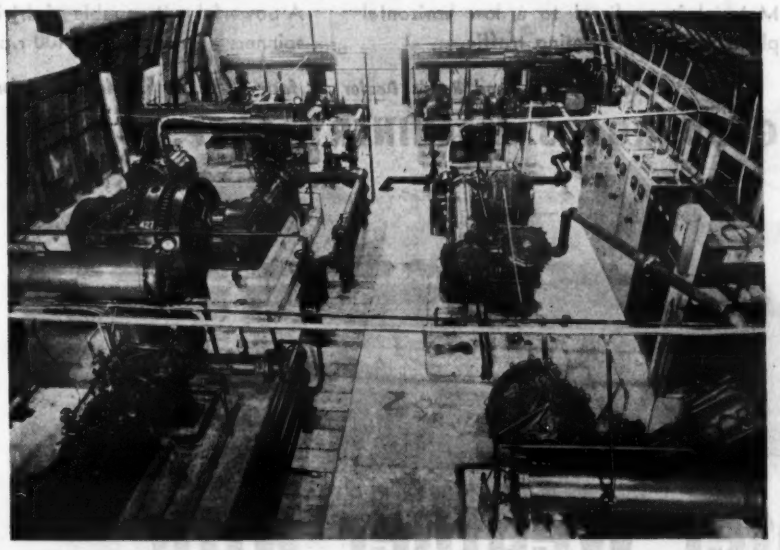
To maintain work on a 24-hour basis, one hundred sixty 1500-watt flood lights, in two series, are stretched across the 2100-foot canyon, on an endless cable. This is powered by a CP Pneumatic Winch so the lights can be pulled in for re-lamping.



CP Pneumatic and Hicycle Electric Vibrators

CP Vibrators, of both electric and pneumatic types, will be used to place the nearly three million cubic yards of concrete.

Batteries of CP Wagon Drills and Diamond Drills . . . CP Sinker Drills in gangs . . . a building full of CP Stationary Compressors . . . CP Portable Compressors in mobile service . . . CP Pneumatic and Electric Vibrators . . . and CP Pneumatic Tools are working around the clock.



Six CP Stationary Compressors furnish the air supply

The main air supply is provided by a stationary compressor plant, where four Type O-CE Compressors and two Type Y Compressors furnish 7010 cfm. of air at 100 p.s.i.

In addition, there are six CP Portable Compressors—five of 500 cfm. capacity and one of 105 cfm.—used for mobile operations.

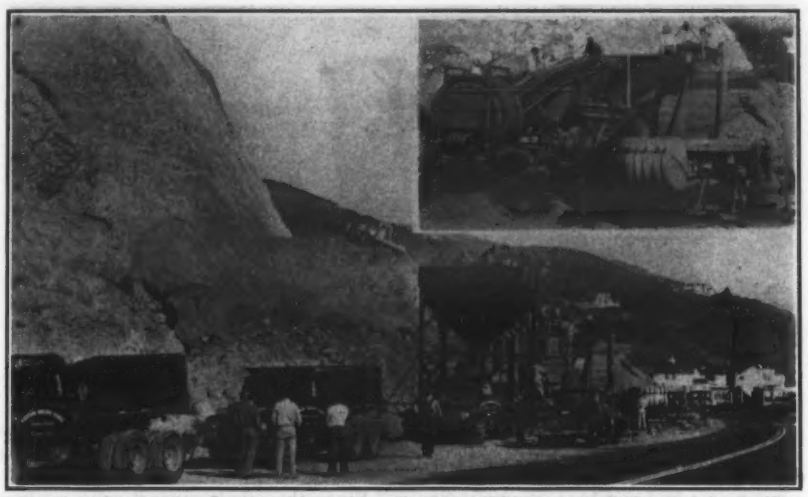
CHICAGO PNEUMATIC TOOL COMPANY
General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

Rock Mesa Cut Down To Straighten Road

An interesting project was handled recently by Dicco-Dix-Syl Construction Co. at Malibu Beach, Calif. A 160-foot-high rock mesa was cut down to straighten a dangerous curve on the coast highway. The hill was dynamited, then the material was scarified and dozed over the hillside to the road below. It was then dozed right into the road-side crushing plant.

The 80,000 cubic yards of excavation cut from two mesas was crushed by a 293Q Universal Pacemaker crushing plant. The plant consisted of a 20 x 33-inch primary crusher with apron feeder, 30-inch TwinDual rolls, 4 x 10-foot 2½-deck Universal Simplicity screen, and necessary conveyors to make a complete plant. The crushed material was trucked to the new roadbed and used as a base course.



To straighten out a dangerous curve on the coast highway at Malibu Beach, Calif., a rock mesa is cut down, and the material is then dozed into a road-side crushing plant (see insert in the upper right-hand corner).

New Diesel Trucks

Two new high-speed heavy-duty diesel trucks, comprising five models of both conventional (D45) and six-wheeler (D645) design, have been introduced by the Federal Motor Truck Co., Detroit 9, Mich.

All of the diesel models are powered by a lightweight high-speed heavy-duty Federal-Hercules Model DWXLD diesel engine with a 4¼-inch bore and 5-inch stroke and a piston displacement of 426 cubic inches. The engine is said to develop 142 hp at 2,600 rpm and to have a gross torque output of 332 foot-pounds at 1,700 rpm.

The high-torque characteristics of this six-cylinder engine, the company points out, should give operators a power unit capable of climbing hills and grades with a minimum of gear shifting. An important feature of this engine is that it has a top operating speed which corresponds with that of gasoline engines of similar displacement. It has been primarily designed for fast motor transport.

The D45 series will be available in three models, with a choice of single-speed or two-speed double reduction rear axles. These models have a nominal rating of 3½ to 5 tons, a gross vehicle rating of 13 tons, and a gross combination weight of 25 tons.

Having a gross vehicle weight of 19 tons, the D645 diesel is available in two models with a choice of tandem double-reduction or worm-drive rear axle. For exceptionally rugged service where maximum gear reductions are required, auxiliary transmissions are available for these models.

Both the D45 and D645 series are equipped with 10:00 x 20 tires, with larger tires available. Air brakes are standard, as is a front-wheel limiting valve. Standard equipment also includes a heavy-duty diesel muffler behind the cab and a Kysor automatic shutter to assure proper engine temperature control.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 2.

Mobile Service School, Steam-Cleaner Dealers

Since most of the 1,700 jobbers who handle Hypressure Jenny steam cleaners were not able to make use of the service-training facilities at the factory, Homestead Valve Mfg. Co., Inc., of Coraopolis, Pa., has purchased and equipped a special truck as a mobile service-training unit. It has just completed a swing of almost the entire nation under the direction of F. A. Rueter and F. E. Schuchman, Jr. A second tour is planned for the near future.

it's "The Jet" with DC-6 CONTROL
DIRECT CAB

CAPACITY 7 CUBIC YDS.

FOR SEAL-COATING . . . ICE AND SLEET CONTROL

Good Roads MACHINERY

WIDTH OF SPREAD:
FROM 12 TO 28 FT. FOR SEAL-COATING.
FROM 12 TO 60 FT. FOR ICE AND SLEET CONTROL.

SPREADS ANY MATERIAL: SAND, GRAVEL, LIME, SALT, CINDERS, CALCIUM-CHLORIDE, ANY OTHER DESIRED

DC-6 CONTROL - - - - - - - - -
Ignition, Starter, Flasher Lights, Clutch, Choke, and Throttle are fingertip controlled from the truck cab. Fits any truck.

STEEL BELT CONVEYOR - - - - -
The controlled intermittent action shakes materials down through the wide throat onto the twin spinner discs.

UMBRELLA SPREAD - - - - - - -
Material is confined to a low horizontal plane thereby protecting traffic.

WATERPROOF, AIR-COOLED MOTOR - -
A powerful unit capable of driving the twin spinners at a speed of 2400 r.p.m.'s.

Contact your Good Roads Dealer or factory for further detailed information or a demonstration

GOOD ROADS MACHINERY CORP. - - - - - - - - - - MINERVA, OHIO

Licking Winter Weather with KIM Hotstart

No heated terminal buildings, and no cold starts. Press the starter, and the engine starts instantly, already warmed up, with full power, ready for the road. Engine wear is reduced; batteries last longer; fuel consumption is decreased.

That's what KIM Hotstart means to this fleet of buses operating in the Pacific Northwest where winter temperatures often range from 10 above to 10 below zero.

What is KIM Hotstart?

KIM Hotstart is a patented pre-heater for gas or diesel engines. Plugged into the electric circuit at the end of the run, the Hotstart draws cold water from the engine, heats it, forces it back into the engine at another point, keeps the engine warm when not in use.

Made in four sizes, there is a KIM Hotstart for all kinds of motor vehicles—automobiles, trucks, fire engines, tractors, buses, stationary engines, diesel locomotives. Quickly installed by any competent mechanic.

For additional information, fill in and mail the coupon. You will receive descriptive literature, and name of your nearest KIM Hotstart dealer.

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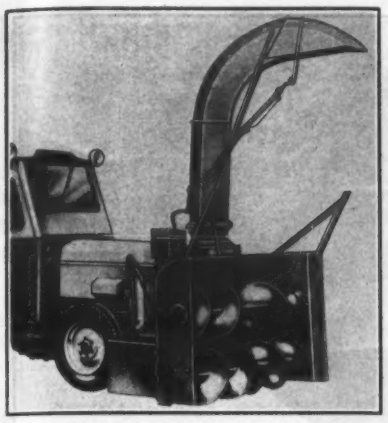

The Cyclone tractor-mounted snow blower and loader manufactured by Transport & Supplies Co., Ltd., of Toronto, is now on the American market.

Snow Blower, Loader

The Cyclone tractor-mounted snow blower and loader manufactured by Transport & Supplies Co., Ltd., 500 Dorchester St., Quebec City, Quebec, Canada, is now in the American market. The Cyclone is fitted with two endless right and left-thread screws which eat into the snow and carry it to the blower. The blower can throw the snow 100 feet to the right or left, or deposit it in a waiting truck.

The blower of the Cyclone is powered by a separate Ford V-8 engine with a maximum torque of 188 foot-pounds at 1,850 rpm. It is equipped with an automatic regulator and a transmission with chains running in oil. This additional engine is placed in the rear of the cabin in which all controls are installed. Mounted on its tractor, the blower measures 17 feet in length and 6 feet in width: the shovel, 6 feet in width and 3 feet 6 inches in height.

The cabin and chassis can be dismantled easily, it is said. This permits the user to convert the blower into a tractor during summer months. A 30-inch-diameter broom 84 inches long can be substituted for the blowing equipment.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 83.

Curved-Finger Glove

A new rubber-coated canvas glove curved to fit the hand and give greater finger dexterity is announced by The B. F. Goodrich Co., Akron, Ohio. Coated with Neoprene, the glove affords protection from dangerous chemicals, caustics, and other irritants, and is also resistant to greases and oils.

The glove is made in three styles—knit wrist, and 12 and 14½-inch gauntlets. The curved fingers give greater knuckle freedom and "natural feel" the entire length of the fingers, says Goodrich, and enable workers to operate with greater safety and efficiency. The gauntlet glove has heavy-duty scalloped cuffs designed to resist abrasion and tearing.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 134.

Composite-Deck Bridges

An illustrated catalog, "Composite-Deck Bridges", has been issued by Timber Structures, Inc., Box 3782 (CJ), Portland 8, Oreg. The folder shows factory-fabricated timber and concrete bridge decks being installed. It also covers erection techniques; pressure treatment of timber members; and economies made possible through eliminating form work and shoring, and reducing the work crew. Details of timber-deck grooves, daps, scupper blocks, felloe guards, and guardrails are given.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 140.

Safety Congress

The 37th National Safety Congress and Exposition will be held in Chicago, Ill., from October 24 to 28. The Construction Section will hold its sessions on Tuesday and Wednesday, October 25 and 26, at 2 p.m. in the West Ballroom on the third floor of the Stevens Hotel.

The program will include: remarks on 1949 activities by Otto S. Holmskog, General Chairman of the Construction Section, and Senior Construction Engineer of the Employers Mutual Liability Insurance Co.; election of 1949-50 officers; and three talks. The talks will be: "How Accident Prevention Pays Off in Cost Reduction" by M. G. Gaskin, President of Taylor & Gaskin, Inc.; "Ingenuity Pays Off" by R. L. Jenkins, Chief Engineer, Safety Division, Office of the Chief of Engineers, Department of the Army; and "Gambling With Accident Prevention" by F. I. Rowe of the W. L. Johnson Construction Co.

There will also be a panel of contractor and manufacturer representatives answering questions from the floor on the topic "How Can Construction Equipment Operations Be Made Safer and Better?", with H. W. Richardson, Editor of *Construction Methods and Equipment*, as moderator.

Heads N.Y. Cement Sales

Appointment of Patrick F. Morrissey as Sales Manager, New York, is announced by the Universal Atlas Cement Co., a United States Steel Corp. subsidiary.

$5.22 a ton for Asphalt
IS WORTH SAVING!

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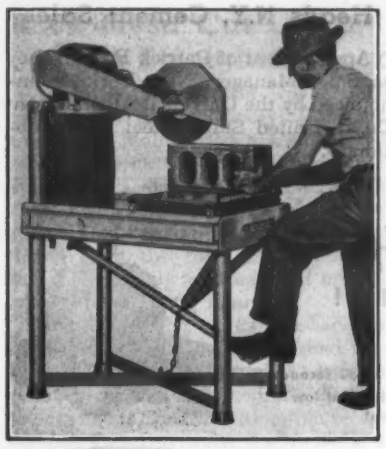


Victor Feedmatic blade-pressure control has been incorporated in the new lightweight Valor masonry saw.

Light Masonry Saw

A light portable masonry saw manufactured by the Victor Engineering Corp., Bristol, Pa., uses automatic blade-pressure control. The Feedmatic feature on the new Valor saw is designed to eliminate operator guesswork which often results in hazardous blade breakage.

The rigid tube design permits lightweight construction; the machine weighs 225 pounds. The 1½-hp motor drives both the water pump and the blade for dry or wet cutting. The saw can be obtained in a dry-cut only model if desired. For those who want extreme portability, a take-apart model is available.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 77.

Detachable V-Belting

Vee Ply belting has recently been added to the V-belt-drive line of Worthington Pump & Machinery Corp., P. O. Box 935, Buffalo, N. Y. Designed to service emergency breakdowns, Vee Ply can be adapted to most V-belt-drive applications. Its best use, the company claims, is on drives which require dismantling a part of the machine to install endless belts. Vee Ply belting is recommended by Worthington for continuous heavy-duty service. It is not recommended, however, for severe shock loads or on drives that are underbelted.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 97.

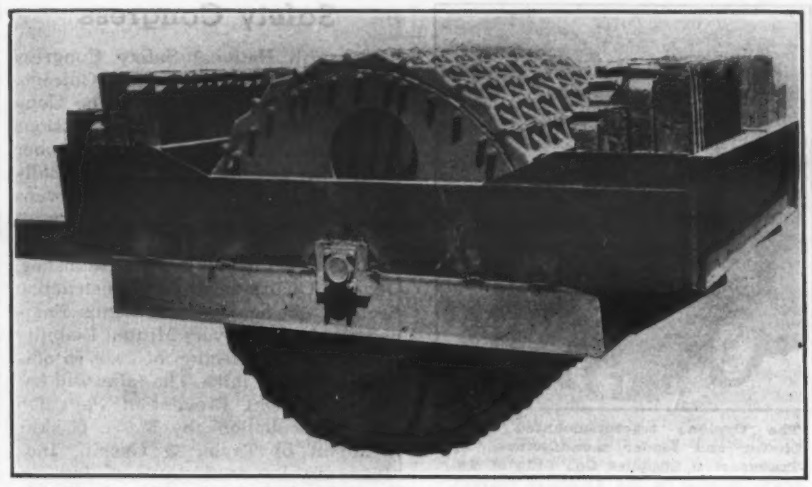
Dual-Use Grid Roller

A grid roller is the latest addition to the line manufactured by the Hyster Co., 2952 Clackamas St., Portland 8, Oreg. It was formerly manufactured by the Gardner-Byrne Construction Co. of Los Angeles, Calif.

It consists of two 5-foot-diameter wheels or rollers attached to a frame which is towed behind a tractor or motor grader. Each wheel is 32 inches wide and is made of 10 sections of heat-treated alloy-steel grid segments bolted onto circular side plates. The grids look like a woven open mesh made by interlacing 1½-inch round bars. The openings are 3½ inches square.

In addition to its use as an earth compactor, the roller has another purpose: that of salvaging and maintaining bituminous or black-top pavement. After the scarifying has been done, the Hyster grid roller breaks up the old pavement, compacts the subgrade after the pavement has been windrowed to the side, and then compacts the fill of replaced broken black-top, preparatory to final surfacing.

Cleaners with cast teeth which mesh on the inside periphery of the grid wheels are provided for use in clay or loam soils. The action is much the same as two gears running in mesh. The soil deposits are pushed out as the teeth pass into the openings. A counterweight box is also available to permit adjustment of load to suit soil and tractor requirements. The box weighs 3,500 pounds and can hold about 16,500 pounds of wet sand. The company claims that the roller performs well at high speeds and recommends the fastest available towing unit.



The Hyster grid roller is designed for soil compaction or for breaking up old black-top in resurfacing or re-treating operations.

Further information on this grid roller may be secured from the company. Or use the Request Card at page 16. Circle No. 109.

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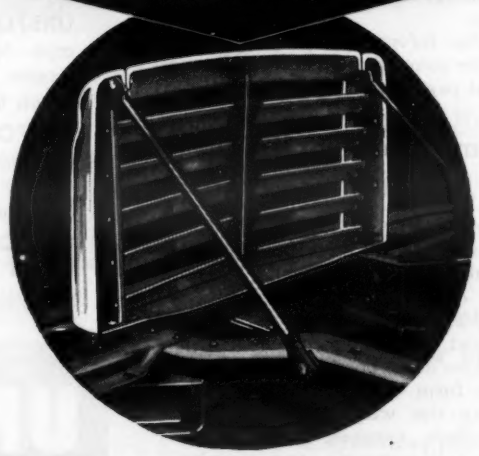

Typical of GMC "H" line ruggedness are angle-braced, frame-mounted radiator grilles with top and sides of spring steel bumper stock, heavy gauge fenders, wide, thick bumpers . . . for complete front end protection, axle to emblem.

Road-Building Rate Falls Short of Needs

Appraisal of Present Construction Shows Vast Task Ahead for Both Engineers and Contractors if Roads Are to Meet Transportation Needs

✦ AT the recent regional meeting of the American Road Builders' Association in Savannah, Ga., J. S. Bright, Deputy Commissioner, Bureau of Public Roads, raised two questions: Are we producing highways fast enough to sustain a transportation system essential for efficient service and the welfare of the nation? And are we producing highways fast enough for the timely completion of the current authorized programs?

In answering these questions, Mr. Bright appraised the entire highway picture—its deficiencies, its needs, the present rate of construction, and the future outlook.

Losses From Highway Deficiencies

A recent estimate by the Brookings Institute indicates that the 1948 highway transportation bill was $30,000,000,000. About one-tenth, or $3,000,000,000, went for highways. The other nine-tenths went for automobiles, insurance premiums, gasoline, parking, lubrication, tires, and for other products provided by private industry. A better public understanding of the ratio between the cost of highways and the cost of highway transportation, Mr. Bright said, would disclose that what appears to be saved by restricting highway expenditures is being lost through excessive vehicle-operating costs resulting from an overly conservative highway program. Current physical deficiencies, he pointed out, are merely the visible symbols of continuous economic loss.

Maintenance expenditures alone on state, county, and municipal highways rose from $393,000,000 in 1921 to $1,132,000,000 in 1948. We pay for our highways, Mr. Bright said, whether we have them or not.

Deficiencies and Needs

The Economic Report of the President, transmitted to the Congress last January, stated: "An annual 3 per cent increase in output and transportation would require an annual expenditure of at least $4,000,000,000 for maintenance, repair and new construction of our road system. . . . Expenditures in 1949, including maintenance and repair, are not expected to equal even half our annual long-run needs."

Deducting the current annual maintenance expenditure from the $4,000,000,000 would mean an annual construction program of $2,900,000,000. That is double the $1,569,000,000 of all state, county, city, and local highway construction work performed in 1948.

Surveys of state, county, and city highway systems in 17 states disclose that 579,010 miles, or 49 per cent of the 1,172,785 miles of highways appraised, are deficient. The estimated cost of correcting these deficiencies over a 10-year period is $16,600,573,353. In comparing highway deficiencies and estimated expenditures needed for their correction, Mr. Bright reminded his listeners that while only 10 per cent of the nation's mileage are primary state highways, they carry 38 per cent of all traffic; 81 per cent, which are secondary and local roads, carry 12 per cent of the traffic; and 9 per cent, which are city streets, carry 50 per cent of the traffic.

State-wide highway studies also disclosed that 48.1 per cent of the combined state, county, and local needs are on the surface; 21.7 per cent, structures; and 30.2 per cent, all other items.

Highway surveys are not the only clarions calling attention to existing highway problems. Records of motor-vehicle registrations and of expanding highway use are just as explicit. Motor-vehicle registrations rose from 10,493,666 in 1921 to 41,151,326 in 1948; the latter figure includes 7,555,330 trucks. Motor-vehicle travel expanded from 55,000,000,000 vehicle-miles in 1921 to 395,000,000,000 vehicle-miles in 1948.

Mr. Bright also called attention to the frequency with which overweight trucks are deteriorating pavements. From counts made at weight-checking stations in Illinois, it was determined that the total yearly occurrence of tractor-semi-trailer and truck and trailer combinations on roads at these locations was 3,016,260 in 1945 and 3,361,285 in 1946. Of these totals, 11.5 per cent exceeded the 18,000-pound limit in 1945 and 15.5 per cent exceeded that limit in 1946. (These overload occurrences were determined only for the station locations and were not projected to an estimate throughout the state).

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(*Concluded on next page*)

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Road-Building Rate Falls Short of Needs

(*Continued from preceding page*)

of living, Mr. Bright pointed out. But how has highway production kept up with the business trend? Some indication, he said, may be obtained by comparison with the national gross product. Using the 1929-36 average as a base, highway construction expenditures for that period were 1.4 per cent of the gross national product. In 1940 they were 0.9 per cent; in 1944 they were at a low of 0.2 per cent; and in 1948 they were 0.6 per cent. Thus, the 1948 rate of highway production would have to be doubled to approach the 1929-36 highway construction rate in relation to the gross national product.

For National Defense

The Public Works Committee of the Congress now have before them a detailed report on the substandard conditions of the Interstate Highway System, and other major routes which are essential to national security and national defense. The final figures of cost for bringing these highways to a state of reasonable adequacy for national defense, as of the present, will total in excess of $10,000,000,000, Mr. Bright reported.

Present Construction Rate

Notwithstanding the delays and problems of the post-war years, Mr. Bright said, there is much promise for the future in the road contracting field. The Federal-Aid Highway Act of 1944 greatly broadens the base for contract construction between the wide extremes of the simplest, least expensive types for the farm-to-market road, to the urban arteries for the use of many thousands of vehicles daily. The three systems — Federal-Aid primary, secondary, and urban arterial—as now definitely selected, total 611,226 miles.

The post-war program set in motion by the Congress in October, 1945, while slow in getting under way, now extends to more than 70,000 miles in all stages, of which 37,529 miles of all classes and types have been completed. Measured in terms of dollar volume of construction put in place, Federal-state cooperative highway construction has accelerated steadily since the end of the war. From approximately $90,000,000 total cost in 1945, it has advanced to $768,000,000 in 1948, and it seems likely that 1949 will see in place about $850,000,000 worth of road construction on the Federal-Aid system.

Summary

The annual highway programs, Mr. Bright said, should be stepped up to a point where reconstruction, betterments, and new construction overcome the accumulated deficiencies. Thereafter a program for the replacement of annual depreciation and highway obsoletion would be adequate.

The extent of additional funds necessary for such an enlarged program is problematical; it depends upon stabilization of prices, and the ability of contractors, material suppliers, and equipment manufacturers to respond to demands. In order that the construction industry be properly geared to the work ahead, Mr. Bright suggested, it should be given a firm long-range program, from 5 to 10 years, in sufficient detail as to type, location, and timing of projects. With the leveling off of prices, and improvement of machinery, organization, and administration, the present source of funds in states which have put their finances in order may be sufficient to finance such a program without resorting to debt obligations against future revenues. Other states, he said, must take stock of their highway problem and put their houses in order. "In other words," he concluded, "we need more long-time planning and teamwork."

Vice Pres. for White Engg.

The election of Ford Kurtz as Vice President in Charge of Engineering for The J. G. White Engineering Corp. was announced recently. Mr. Kurtz is also a Director of the company, and since 1940 has served as Engineering Manager and Chief Hydraulic Engineer.

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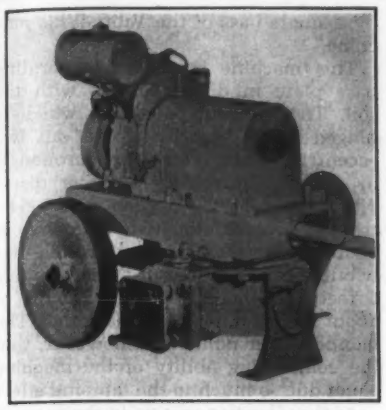

The new Rex 4-inch closed diaphragm pump has a capacity rated at 6,000 gph for a 10-foot suction lift.

New Diaphragm Pump

A new Rex 4-inch closed diaphragm pump, with a capacity rated at 6,000 gallons per hour for a 10-foot suction lift, has been announced by the Chain Belt Co., 1600 W. Bruce St., Milwaukee 4, Wis.

This new 440-pound pump is of all-welded steel construction; an alloy steel is used for rust and abrasion resistance and lighter weight. Helicoid-type cut gears mounted on ball bearings running in oil are in an all-enclosed gear case.

The crank arm of the Rex pump has needle bearings and a shear pin. The shear pin is a safety measure to protect the gears and power unit in case of abnormal overloads or severe clogging. Changing the diaphragm is said to be a quick and simple operation. The pump opens like a pair of scissors and only four wedges need be knocked out to replace the diaphragm. Other features include a handy cleanout opening, a 3¾-hp air-cooled motor, and steel or pneumatic tires.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 17.

Flexible-Tubing Line

Flexible tubing in a wide range of styles designed to meet nearly all applications is manufactured by the Pennsylvania Flexible Metallic Tubing Co., 7200 Powers Lane, Philadelphia 42, Pa. Among the styles produced by the company are heavy-duty interlocked, medium-duty high-ridge, extra flexible, lightweight squarelocked, unpacked interlocked, and corrugated tubing.

The various types of Penflex tubing and hose can be used for pavers, bituminous distributors, tank cars, barrel fillers, diesel installations, and tar or asphalt heaters.

Further information, including a number of illustrated bulletins listing specifications and uses for the wide variety of styles and types, may be obtained from the company. Or use the Request Card at page 16. Circle No. 133.

Bulletin on Feeders

A new 8-page bulletin on Cedarapids apron-type and reciprocating-type feeders has recently been put out by the Iowa Mfg. Co., Cedar Rapids, Iowa. It gives detailed descriptions and specifications of the complete line of Cedarapids feeders, and shows their operation and use in typical installation photos and diagrams.

Bulletin FE-1 deals with feeders for use with all types of material-handling and bituminous-mixing plants. For the latter, there are apron-type feeders which control the proportions of aggregates and assure steady operation of the plant, special two or three-compartment hoppers with feeders, and special three-compartment charging hoppers with three individual feeders.

Also described is a heavy-duty apron-type rock feeder for ground-level feeding when raw materials are handled by truck or scraper. Loading traps are designed to handle direct dumping. Reciprocating-type feeders are particularly efficient, the bulletin points out, where equipment is fed with an intermittent load.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 4.

Catalog on Wheelbarrows

Catalog No. 73, on the American line of wheelbarrows, has just been released by The American Steel Scraper Co. of Sidney, Ohio. This 12-page folder describes each model and lists specifications below a photograph of each.

The catalog discusses the de luxe concrete barrow, a heavy-duty stone barrow, and two models of heavy-duty contractors' and industrial barrows. The last two pages deal with repair parts for the barrows.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 11.

Grader Specifications

A data sheet listing complete specifications of the Allis-Chalmers Model D motor grader has been issued by Allis-Chalmers Mfg. Co., Tractor Division, Milwaukee 1, Wis. The 34.7-hp grader weighs 8,500 pounds and has a 10-foot blade length. A photograph of the Model D appears on the front of the specification sheet.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 119.

Aeroil OIL-BURNING INCINERATOR

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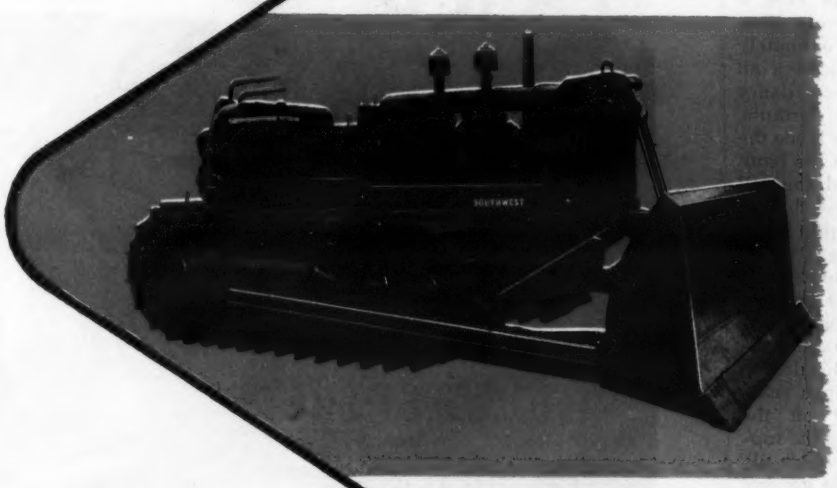

The new bulldozer and trailbuilder equipment developed by SOUTHWEST for use with Allis-Chalmers HD-19 tractors have proved exceptionally efficient and reliable in all types of operations. These are rugged, dependable units that provide outstanding economy and long service life.

Type "AFB" Bulldozers and Type "AFT" Trailbuilders for use with Allis-Chalmers Tractors.

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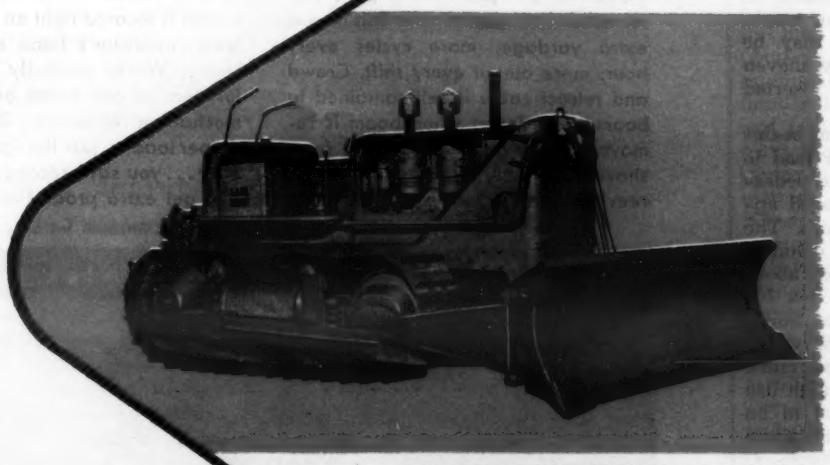
BULLDOZERS AND TRAILBUILDERS NOW AVAILABLE FOR ALLIS-CHALMERS HD-19 TRACTORS



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Bulldozers can be furnished with either adjustable arms or with side arms welded to blade.

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New Compactor Used For Soil Foundation

Flat-Slab Mat Construction Instead Of Pile Foundation to Support a One-Story Warehouse; Requires a Well Compacted Soil Base

By MICHAEL SPRONCK,
Assistant Editor

✦ TO avoid driving long supporting piles, a flat-slab reinforced mat foundation was used for a one-story warehouse recently built for the Esso Standard Oil Co. of New Jersey at its Hackensack, N.J., plant. Though not unique, this construction is interesting in view of the application of a vibratory soil-compacting machine, new in the United States, for the compaction of the supporting fill. The job is under contract to The Austin Co. of New York City.

The new warehouse, 82 x 82 feet, will be an addition to the existing warehouse which adjoins it. The floors of both buildings are to be at the same elevation so that materials can be moved easily from one warehouse to the other. This of course requires that both have firm foundations or else that a correction for settlement can be made. The old warehouse, built in about 1936, is supported on Raymond concrete piles. These piles were driven approximately 92 feet to a penetration indicating an allowable load of 30 tons in accordance with the *Engineering News* formula. This foundation was necessary since the building is about 25 feet from the bank of the Hackensack River and the soil stratum is a poor supporting brown clay with traces of sand. The pile foundation maintains the floor elevation of the old warehouse at truck height.

The designers felt that the floor of the new building could be kept at approximately the proper elevation without the use of piles. They decided to support the building on a 9-inch reinforced-concrete mat resting on the ground surface, after removing the topsoil and replacing it with a cinder fill. The cinder-fill topping over the general excavation is designed to form a capillary break and thereby preclude the possibility of water being drawn from the river near by and causing frost action during the winter months.

It is expected that even with a good surface compaction, the warehouse will settle an undetermined amount because of the nature of subsurface soil. The floors of the two buildings will be kept nearly even, however, by jacking up the new building and using shims on the pedestals to restore the floor height to that required. The shims may be varied as to size to care for any uneven settlement, and they may be inserted whenever required.

A grillage of steel girders and beams will carry the warehouse floor load to the pedestals. The intermediate pedestals, 16 inches square, are spaced approximately 10 feet on centers. The pedestals supporting the roof columns are 28 inches square and placed about 25 feet apart. The flooring is 2 x 10-inch greenheart wood from South America. This is a very dense wood, weighing from 65 to 75 pounds per cubic foot, and is required for the rough use expected. Nail holes will have to be drilled in it for fastening to the nailers on the supporting beams.

Vibratory Soil Compaction

In order to reduce the anticipated settlement of the building, the Austin engineers decided to use a Vibro-Plus vibratory compactor to compact the soil in place before spreading the cinders. Though the compactor had been used for many years in Europe, this was the first time it had been used in the United States.

C. & E. M. Photo

A Vibro-Plus machine compacts fill which will support a flat-slab mat foundation for a new warehouse being built at the Hackensack, N.J., plant of Esso Standard Oil Co. of New Jersey. The Austin Co. of New York City holds the contract.

Cinders for topping were brought to the site in a 14-cubic-yard Autocar dump truck. Then a Caterpillar dozer spread them in a 6-inch lift and brought the surface to proper grade. After the cinder fill was placed it was compacted by a single pass of the Vibro-Plus machine.

This machine has a solid vibrating base plate in direct contact with the soil. The vibrating element, which is hinged to the base plate, contains two eccentrics which rotate synchronously in opposite directions to give direct vibratory motion. The cooperating centrifugal force of the two eccentrics is about 9,000 pounds. This force is distributed over an area of approximately 6 feet and therefore gives a blow of about 1,500 pounds per square foot. The manufacturer points out, however, that the compacting ability of the machine is not due so much to the tamping effect as to the vibrations set up in the ground.

It is possible, by turning the steering wheel, to offset the eccentrics from the vertical plane and allow the machine to move forward or backward under its own power. On this job the machine moved along at a rate of about 15 feet per minute. It was estimated that one or two passes would give the soil ade-

(Concluded on next page)

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HALF YARD steps up output

1 CHAIN DRIVE gives fast crowd and retract

On the Koehring Heavy-Duty, Half-Yard shovel, chain drive gives fast crowd — 84' per minute . . . fast retract—143' per minute. This means extra yardage, more cycles every hour, more output every shift. Crowd and retract cable is self-contained in boom, stays intact when boom is removed. Every time you convert from shovel to another attachment you save reeving time . . . lowers cable costs.

2 PUSH-BUTTON DIPPER TRIP works every time

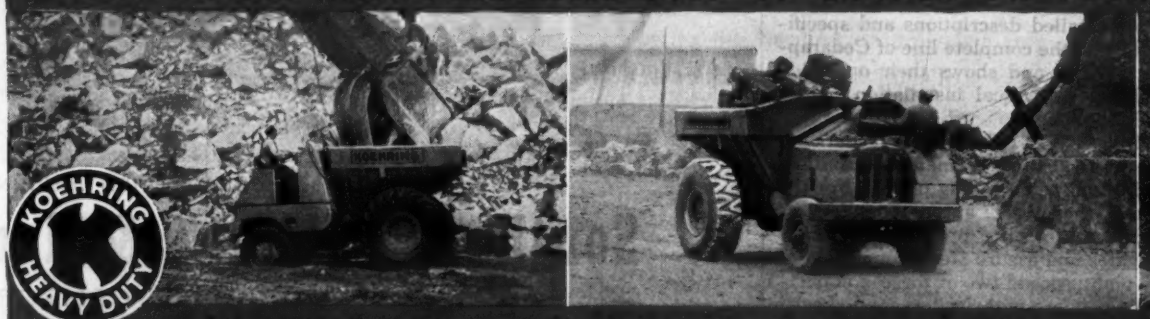
Every time operator pushes trip button, dipper door opens in less than ½ of a second. Thumb-sized release button is located right on top of swing lever; operator's hand never leaves lever. Works perfectly without adjustment at any boom angle. Entire mechanism enclosed. Dumping the dipper load at just the right second is easy . . . you save seconds every cycle . . . get extra production every shift.

3 INDEPENDENT TRAVEL cuts non-productive time

On the Koehring 205, two-speed traction is free, independent of all other operations. A separate lever controls each crawler. You can travel, swing, hoist, raise or lower the boom all at the same time. Whenever you move frequently, or change boom angles to change reach, this quick maneuverability cuts non-productive time . . . steps up production on some jobs as much as 50%. More work every day.

Write for illustrated bulletin on new 2½-yd. KOEHRING Model 1005.

• • • KOEHRING DUMPTORS WILL STEP UP OUTPUT ON YOUR



Also, check with your Koehring Distributor on the Heavy-Duty

KOEHRING COMPANY

quate compaction.

If the machine proves itself here as it has in Europe, it should have application whenever a high degree of compaction is necessary on a small-size job where it is not economical to use larger equipment. Tractor-towed, it is also adaptable to large jobs.

Flies Contractor's Plane

One thousand hours at the controls of Beechcraft Bonanzas in twenty months—the equivalent of more than 160,000 miles—is the record just completed by Andy Witmer, staff pilot for a Texas general contractor. He says the Bonanza easily gets in and out of small landing spaces.

The one he flies is equipped with a set of gyro instruments as well as high-fidelity radio instruments.

Witmer has put in 235 hours of flight time in the past six months working for H. B. Zachry Co., general contractor, with operations in Laredo and San Antonio, Texas.

Andy Witmer, staff pilot for the H. B. Zachry Co., Texas general contractor, with the company's Beechcraft Bonanza.

4 ways

250 TRENCHLINER* has 30 digging speeds . . .

Here's a fast, powerful Trenchliner that gives maximum efficiency in any material short of solid rock. Model 250 has 30 digging speeds from 3" to 117" per min. Digs up to 12½ ft. deep . . . 16 to 42 in. wide. Ladder-type boom shifts to extreme right or left . . . cuts to within 11 in. of side obstructions. Other models: 200, 221, 310 . . . and the rubber-tired utility-size, mobile Model 80.

PARSONS COMPANY NEWTON IOWA

ELEVATING CHARGER for batch or transfer plant

Johnson's new Elevating Cement Charger has size 14, 1000-lb. cap. cement weigh batcher, hung under a 33-bbl. cap. overhead storage hopper. Upper hopper can be equipped with two 1000-lb. weigh batchers, for charging dual-batch trucks. Adapted from batch to transfer plant by adding 50-bbl. extension hopper. Easily moved, set up by dump truck . . . no crane needed.

C. S. JOHNSON COMPANY CHAMPAIGN ILLINOIS

4 CLUTCHES need no "warm-up" adjustments

No need for operator to take time out, when he starts in morning and after lunch, to loosen cold clutches, then tighten them when they warm up. With the 205, heat-compensator springs on six main clutches automatically keep clutches working smoothly and easily, without manual adjustments. This feature is very important on clamshell work where you tend to have intermittent service.

OFF-ROAD HAULING

304 and 605 Shovels

MILWAUKEE 10, WISCONSIN

11-S DANDIE* discharges full batch in 7 seconds . . .

Big-production, Kwik-Mix 11-S Dandie gives top-quality concrete mix, saves time every batch. Re-mixing drum folds as it mixes . . . 85 times every minute. Exclusive Flow-line Discharge Chute reaches deep into drum, discharges full 12.1-ft. batch in 7 seconds. Side or end discharge. Also available with tower loader. Other Dandie sizes: 3½S, 6-S, 16-S.

KWIK-MIX COMPANY PORT WASHINGTON WISCONSIN

Tomorrow's Engineer —Still Inarticulate?

A Broader Engineering Curriculum, Rather Than More Years of Study, Is Needed if Engineers Are to Learn How to Express Themselves

✦ PERHAPS in the past, a technician who was unable to express himself without a slide rule squelched his critics by advancing the maxim that silence is golden. Engineers, similarly handicapped, have found comfort in that maxim and made of it a sort of professional motto. The public, too, has been quick to seize upon the silence of the engineer as his dominant characteristic, and to picture him as a wordless creature—a man isolated from his fellows and occupied with attempts to harness nature; a picturesque figure in high shoes and mud-spattered khakis, with one eye surrounded by lines from squinting into the sun for a full 14-hour work day.

So completely has this notion of the inarticulate engineer been accepted that little attempt has been made to equip him to be otherwise. English courses have formed a negligible part of the engineering curriculum, and those that were offered usually concerned themselves with a particular verbiage called "engineering English", suitable only for presenting technical reports.

Some changes in the education and the personal qualifications of the engineer are necessary if this sterotype is to be done away with, said E. W. Wendell, Deputy Chief Engineer of the New York State Department of Public Works, in an address at the convention of the New York State Association of Highway Engineers at Albany, N. Y.

Mr. Wendell maintains, along with many educators and professional leaders, that although the engineer is an outstanding product of a system of specialized education, he is also its victim. Unless the weaknesses of that overspecialization as they manifest themselves in the social and professional life of the engineer are overcome, the engineering profession itself will suffer. The engineer will come to be regarded as a sort of super mechanic rather than a person whose knowledge and achievements entitle him to a prestige equal to that accorded a physician or a lawyer.

Longer Study Not the Answer

Some of those most concerned have suggested that the attainment of a satisfactory level of self-expression is the responsibility of the engineer, and that it should be acquired by further study in the years after college. Other planners for the engineer's time after graduation recommend that he also familiarize himself with the problems and techniques of fields related to his own; the designer should have experience in construction, the construction man in designing, for example. Mr. Wendell reminds us that there are only so many hours in a day, so many days in a year, so many years in a lifetime. The graduate engineer may have assumed new responsibilities such as a home and family which make demands on his time and preclude the use of any great part of it for additional study. These new responsibilities would also make him hesitant about changing jobs for the sake of experience if the pecuniary reward of such an action were not immediately realizable.

It is characteristic of our culture and the prestige we give to education that although we may feel the present educational system responsible in part for the plight of the engineer, we feel that the remedy for the plight lies in more years of education. Mr. Wendell holds,

(Concluded on next page)

Tomorrow's Engineer —Still Inarticulate?

(*Continued from preceding page*)

instead, that the training given in our educational institutions over a reasonable number of years should produce "as near a finished product as can be expected". To accomplish this, it is essential that the engineering curriculum be broadened.

The Engineer of Tomorrow

When it is broadened, says Mr. Wendell, the highway engineer of tomorrow will, of course, receive the basic training necessary for his advancement in his profession. He will also have what engineers of today so woefully lack—training in plain, everyday English. Broadening the technical basis of education will help break down intra-professional barriers, and a good working knowledge of English will enable the engineer to establish better relations with the public and with his fellow engineers by improvement in the phraseology of contract proposals and reports. He will have achieved an ability to express himself as adequately as any member of any other recognized profession.

"To be able to think properly and to reach logical conclusions," says Mr. Wendell, "is a necessary function of a trained engineer. But the real value resolves itself in our ability to express these thoughts so as to substantiate our conclusions."

New Officers for ISEA

Lawrence E. Dickson, President of the Standard Safety Equipment Co. of Chicago, was elected President of the Industrial Safety Equipment Association for the second consecutive year at the Association's annual meeting. Charles H. Gallaway, Sales Manager of American Optical Co.'s Safety Products Division, was elected Vice President. William J. Parker of William J. Parker, Inc., New York City, was elected Secretary-Treasurer.

Air Compressor Changed

The Model 15B portable gasoline-driven air compressor now replaces the Model 15 or ZZ-15, says the P. K. Lindsay Co., 97 Tileston St., Everett 49, Mass. The primary reason for the change is that the engine manufacturer discontinued the former Model ZZ engine and replaced it with an improved one. For the purpose of ordering parts, the company states, the important thing is to give the correct model designation and serial number, as many of the compressor parts had to be modified for use with the new engine.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 145.

Pressure Distributors

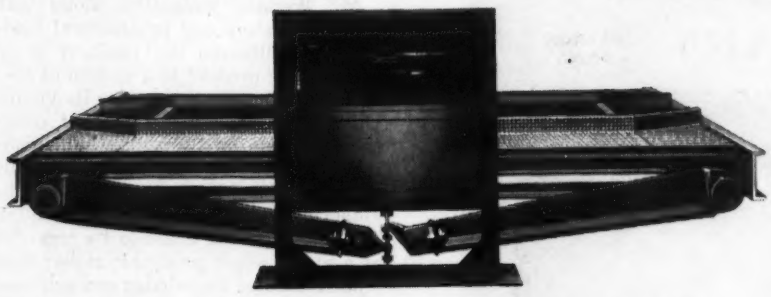
New Spray King pressure distributors, ranging in capacities from 800 to 2,000 gallons, are announced by Littleford Bros., Inc., 485 E. Pearl St., Cincinnati 2, Ohio. There are two basic models: the HV with vaporizing torch-type burners, and the HL with low-pressure atomizing burners. Both models can be either truck or semi-trailer-mounted. The Spray King will spray hot and cold road oils, tars, asphalt, emulsions, and cut-backs.

The new Littleford Spray King pressure distributors are made in sizes ranging from 800 to 2,000 gallons. There are two basic models—one with vaporizing torch-type burners and one with low-pressure atomizing burners.

These models feature a choice of end-folding spraybars, both full-circulating and standard suck-back, single valve control, heat chamber for pump and valves, a 28-hp engine with clutch and four-speed transmissions, hand spray attachment, pump with a capacity of 375 gpm at 375 rpm, and quick-acting connections for attaching spraybar extensions. When two bolts are loosened, the extensions slide into place or can be removed.

Further information on the new Spray King may be secured from the company. Or use the Request Card at page 16. Circle No. 46.

A PORTABLE TRUCK SCALE



That Really is Portable

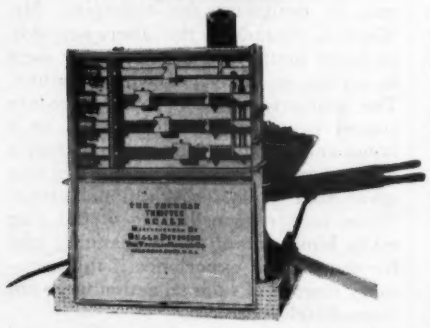
The Thurman Portable Truck Scale was designed for use by contractors who wish to move their scale from job to job. This scale can be lifted onto a truck by hooking a sling into loops placed at the four corners of scale frame.

Extra large steel bases support scale so it can be placed on firm ground—requires no concrete footings nor timbers.

An accurate, sturdy and economical scale built to the rigid requirements of the U. S. Bureau of Standards.

Standard Capacities from 18—30 Tons——Deck Size 18'—30'

WHEELBARROW SCALES



The Thurman Wheelbarrow Scales are built for years of trouble-free service. Hundreds of scales in use throughout the American continents have proven their dependability.

Scales furnished with tare beam and two or three ingredient beams.

Capacity 1,000#—Deck 30" x 42"
Capacity 500#—Deck 21" x 33"

All scales are sold with unconditional factory guarantee and are fully backed by your distributor.

SCALE DIVISION

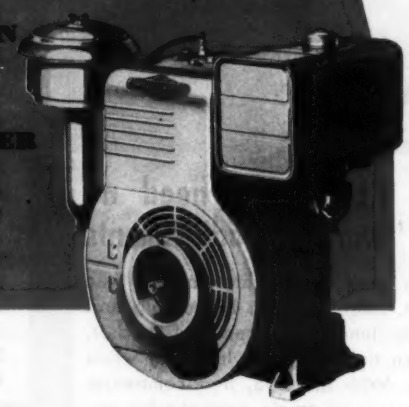
THE THURMAN MACHINE CO.

156 North Fifth Street
Columbus, Ohio Established 1918

As always —

. . . Leaders in advanced features and design developments

. . . RESULTING FROM 30 YEARS OF CONTINUOUS ENGINEERING AND PRECISION PRODUCTION OF 4-CYCLE SINGLE-CYLINDER AIR-COOLED ENGINES



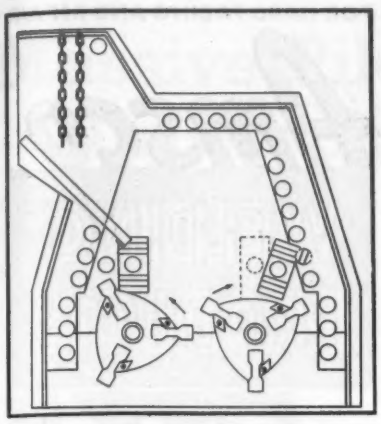
The experience gained in building more than 4 million air-cooled 4-cycle gasoline engines—during 30 years of uninterrupted production—plus the knowledge acquired in putting air-cooled power to work on all types of equipment, machinery and appliances—for civilian and military uses—in industry, construction, by railroads and on farms—all this broad technical background has kept Briggs & Stratton always *first* in modern design and advanced features.

The best in modern development—best methods of precision construction—the best procedures in laboratory and field testing—most complete manufacturing facilities—these are all present and basic in Briggs & Stratton engine building. For all that is best in design, features and performance in air-cooled power, manufacturers, dealers, and users look to Briggs & Stratton.

BRIGGS & STRATTON CORP., Milwaukee 1, Wis., U.S.A.

World Wide FACTORY SUPERVISED SERVICE

4 CYCLE BRIGGS & STRATTON GASOLINE ENGINES



In this cutaway view of New Holland's redesigned Model 3030 double-impeller breaker, the dotted line at right shows the former area of adjustment for the breaker bar set over the impeller at right. The solid line shows how the breaker bar is now adjustable outward and upward in order to permit feeding longer slabs without bridging, and to increase reduction.

Rock Breaker Will Take Longer Slabs

A new Model 3030 New Holland double-impeller breaker designed for primary crushing has been placed in production by the New Holland Mfg. Co., Mountville, Pa.

This is the second breaker the company has brought out to handle stone passing a 30-inch opening. The new design of the second model permits the feeding of longer slabs without bridging. Both models will be kept in production. The present Model 3030 will be used as a secondary crusher and as a primary crusher where unusually long slabs are not encountered.

Major change in the new 3030 is the relocation of the adjustable breaker bar over one of the twin impellers in the breaking chamber. Adjustable upward and outward, the bar moves to permit feeding of longer slabs.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 35.

Steam Cleaners

The Chem-Therm steam cleaner made by the Chem-Therm Mfg. Co., 101 W. Green St., Pasadena 1, Calif., is a compact oil-burning unit with a capacity of 150 gallons per hour. Its overall dimensions are 43 inches high, 44 inches long, and 24 inches deep, and it weighs 670 pounds. The cleaner is mounted on two 12-inch wheels and one 6-inch swivel wheel.

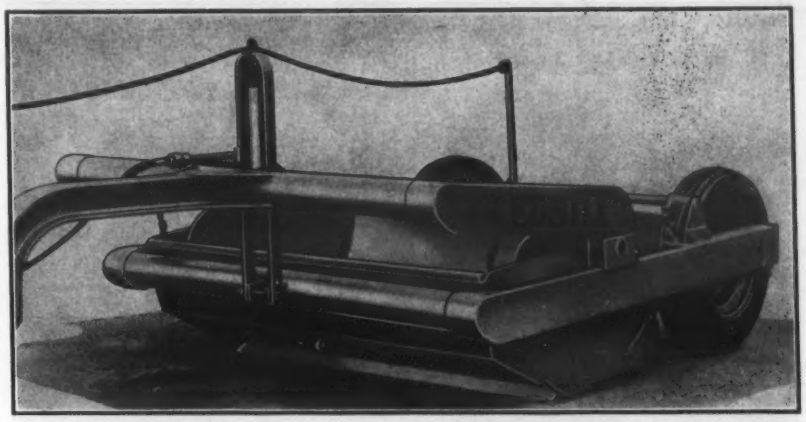
The Chem-Therm is simple to operate, the manufacturer reports. Just flip a switch, turn the valve, and it goes to work. Features include the gun-type burner, the Chem-Therm diaphragm pump, the precision-built pressure regulator, and the accumulator which does not need to be drained. No pre-mixing of detergents is required; the amount used is controlled by a valve to insure maximum economy of operation. Minor adjustments on the Chem-Therm are easily made when necessary. The cleaner can be tipped by one man so that it rests on the back wheels and the back of the base plate, making the whole underside of the plant accessible.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 6.

Highway Research Review

The first issue of the "Highway Research Review" has been published by the Highway Research Board, National Research Council, 2101 Constitution Ave., Washington 25, D. C. It is designed to provide subscribers to the Research Correlation Service with a classified listing of highway research projects in progress, or recently reported on, by state highway departments, Federal bureaus, universities, colleges, and other agencies. However, this listing is by no means complete and will be continued in future issues.

The review will be published quarterly, and subsequent issues will probably also include articles and editorials on current research, brief digests of information on specific highway problems, and comments on needed highway research and development. It is hoped that this service will afford highway administrators a useful summary of the overall highway research and development effort. Sponsors of the review invite cooperation in providing informative material.



Designed to work with wheel tractors as well as the small crawler models, the new Gledhill front-dump scraper has a 35-cubic-foot heaped capacity.

A New Earth-Mover

A new earth-mover has been introduced by The Gledhill Road Machinery Co., of Galion, Ohio, to broaden its line of light road-working machinery.

This is a front-dump scraper designed to work with wheel tractors as well as small crawler tractors. It has a capacity of 27 cubic feet struck and 35 cubic feet heaped. With an overall length of 11 feet 6 inches and width of 5 feet 9 inches, this earth-mover will cut from 0 to 6 inches and has a carrying ground clearance of 8 inches. It has two 6-ply tires, 6:50 x 16.

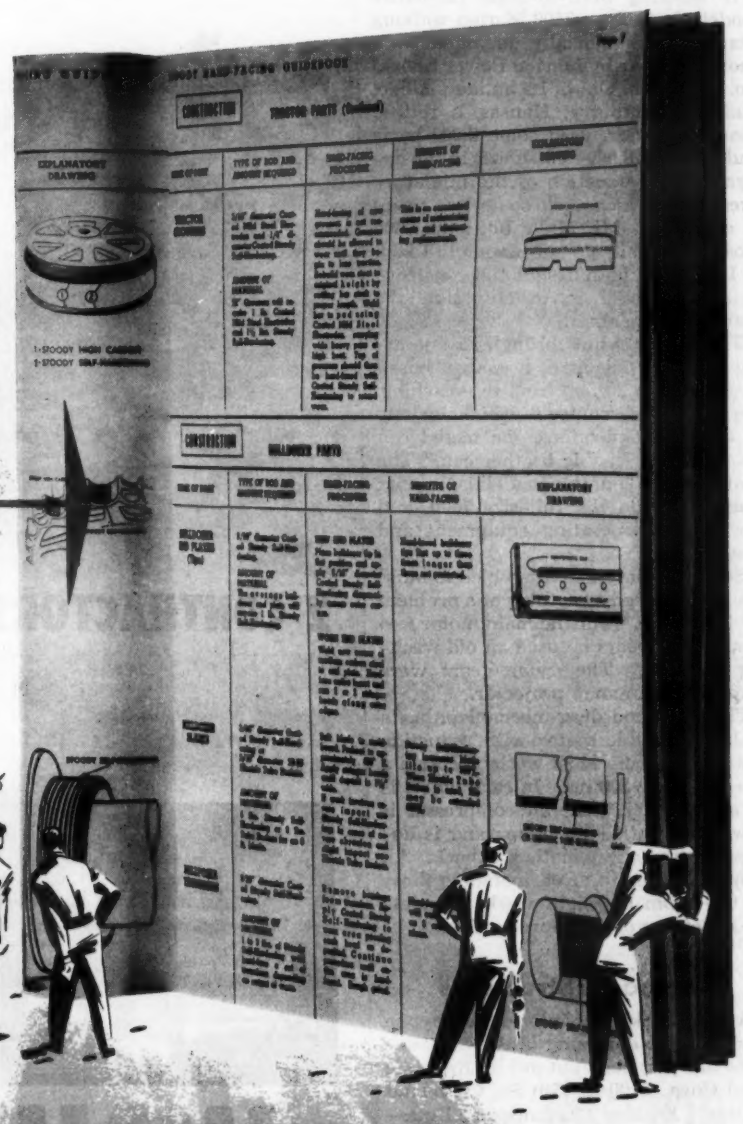
Dumping and spreading are controlled by raising and lowering the bowl in the spreading position. All controls are completely hydraulic.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 22.

STOODY

Hard-Facing Guidebook

chock full of proven hard-facing applications



a valuable aid to maintenance men!

A lot of hard-facing success is in the use of correct alloys applied in the right way. If you want to eliminate failures, gain utmost life increase and savings in equipment dollars—get your copy of the STOODY HARD-FACING GUIDEBOOK!

Clear, concise descriptions of each hard-facing application provide the all-important know-how for common earth handling-crushing-mixing equipment in your industry. It costs you nothing—may provide the answers to more economical operation, fewer equipment breakdowns, more profit!

Simply ask for the "STOODY HARD-FACING GUIDEBOOK" on your letterhead; it will be mailed post-paid to your personal attention. *But it can't help you until it's in your hands—Write today!*

STOODY COMPANY

11936 EAST SLAUSON AVENUE, WHITTIER, CALIFORNIA

This working miniature model of the Marion Type 7400 walking dragline can do everything its big brother can do. It was built by Albert Malle of Mulberry, Kansas, to a scale of approximately 1 inch to 1 foot. He used some 3,000 parts and invested 6,900 man-hours in its construction.

Build Working Model Of Walking Dragline

A working built-to-scale miniature model of the Type 7400 Marion walking dragline was officially unveiled at a show this year by Marion Power Shovel Co. of Marion, Ohio. Its builder, Albert Malle of Mulberry, Kansas, a retired shovel operator, used some 3,000 parts and invested 6,900 man-hours in the design and construction of the miniature excavator, which took some two years to complete. Mr. Malle built the 7400 model to a scale of approximately 1 inch to 1 foot. In both design and construction the model is exactly like the Marion 7400 Walker.

The model is put through its operating paces by means of a control board located about 20 feet from the machine. Through these controls, which include 16 electric connections, the model can do everything its big brother can. The control room on the model is located where it is on the full-size 7400, and has dummy operating equipment and seat.

Securing material with which to build the model posed something of a problem for Mr. Malle. For the main motor and some of the gears he used an old washing machine. The swing gears were taken from a movie projector.

The hoist and drag mechanism has a ¼-hp reversible motor with reduction case. The boom hoist works through a worm gear, 1/200 hp. In each wheel is an air cylinder. The air compressor is powered by a ⅓-hp motor and is designed with an automatic kickback. All proper lighting fixtures, including those on the boom for night work, complete the exactness of the reproduction.

Drainage Structures

A new booklet of interest to anyone specifying or designing drainage structures has just been put out by Republic Steel Corp., 3100 E. 45th St., Cleveland 4, Ohio. Entitled "Engineering Data—Toncan Sectional Plate Pipe, Pipe-Arch, Arches", it contains essential design and estimating information on Republic's new sectional plate drainage products with 2-inch corrugations.

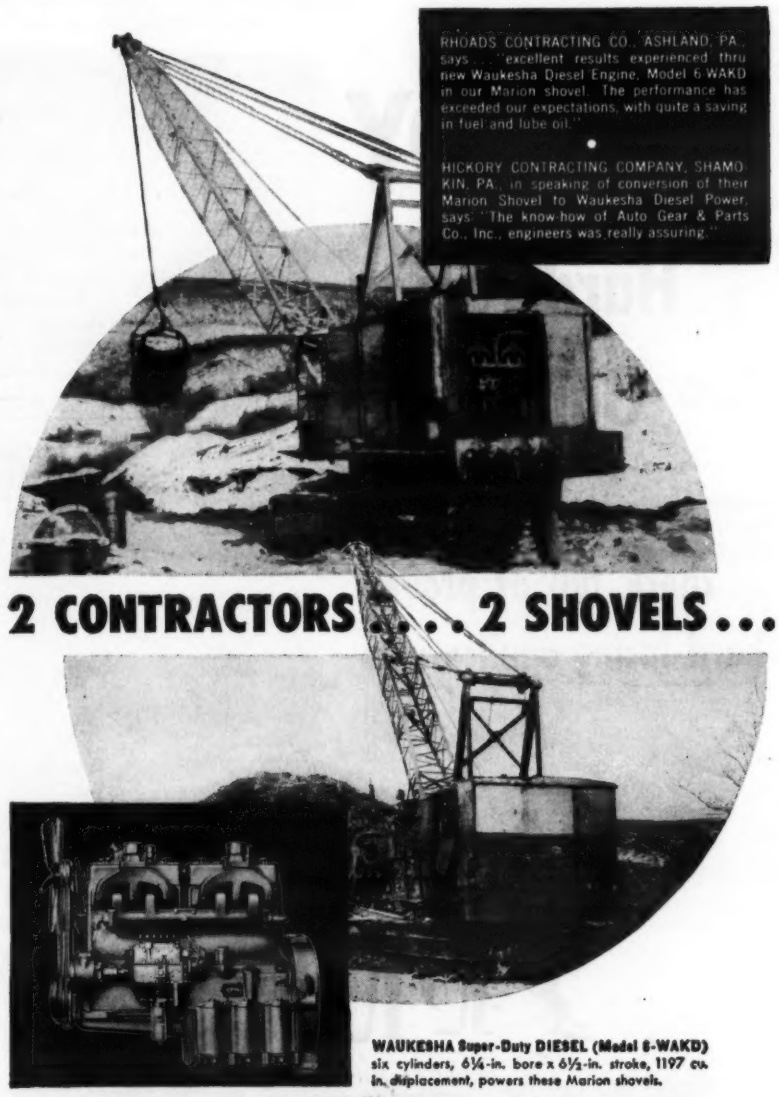
Illustrated with both drawings and pictures, the 16-page manual includes tables useful to the engineer in his work. Typical are those on minimum gages for strutted and unstrutted pipe, length and spacing of struts, standard sizes of arches, weights of various products, plate arrangements, etc.

This literature may be obtained from the company or by using the Request Card at page 16. Circle No. 71.

Writing Contracts, Spex

The know-how of writing contracts and specifications is treated in the second edition of "Engineering Contracts and Specifications" by Robert W. Abbett, Consulting Engineer, Knappen Tippetts Abbett Engineering Co. The book points out technical and legal pitfalls to guard against in engineering-contract work. The author is not a lawyer, but an engineer with a great deal of experience in preparing contracts—hence his book is designed as a practical guide for engineers, architects, and contractors.

Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y., the book sells for $3.75.


RHOADS CONTRACTING CO., ASHLAND, PA., says . . . "excellent results experienced thru new Waukesha Diesel Engine, Model 6 WAKD in our Marion shovel. The performance has exceeded our expectations, with quite a saving in fuel and lube oil."
HICKORY CONTRACTING COMPANY, SHAMOKIN, PA., in speaking of conversion of their Marion Shovel to Waukesha Diesel Power, says: "The know-how of Auto Gear & Parts Co., Inc., engineers was really assuring."

2 CONTRACTORS . . . 2 SHOVELS . . .

WAUKESHA Super-Duty DIESEL (Model 6-WAKD) six cylinders, 6¼-in. bore x 6½-in. stroke, 1197 cu. in. displacement, powers these Marion shovels.

WAUKESHA
Diesel POWER
does a better job for BOTH!

For shovel work particularly, the most outstanding of all Waukesha Diesel characteristics is smoothness and trigger-quick response to the operator's every command. Lively, yet shudder-free, it meets every power and load demand with all the smoothness of steam. And that's a new experience, even to an old Diesel hand. Clean burning, its fuel economy is excellent. Built with rugged simplicity. Such features as hard, wet cylinder sleeves, simple overhead valve mechanism, gear-driven water pump cooling, and pressure oiling—all make the Waukesha Diesel easy to understand and simple to service. For all the details, send for Bulletin 1415.

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN
NEW YORK TULSA LOS ANGELES

WILLIAMS
"SUPER-HI" TENSILE STEEL
Concrete Form Hardware
Clamps—Tie Rods—Couplings
and Pigtail Anchors
GREATER SAFETY
LESS WEIGHT TO HANDLE
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Ask for new booklet:
"The Metallurgical Background for Welding Manganese Steel"

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395 E. 14th St., Chicago Heights, Illinois
Offices in Principal Cities

CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Avenue, New York 16

Enclosed is my remittance of $3 for the next twelve issues of Contractors and Engineers Monthly.

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N. B., Cash, check or postage stamps will be entirely acceptable.

Massive Pile Hammer Drives Through Rock

Sandstone Penetrated as Monstrous Hammer Shows Its Power on Waterfront Concrete Dock Project

By RAYMOND P. DAY,
Western Editor

(*Photo on page* 1)

✦ IMAGINE nine Cadillac automobiles dropped at once on your toes.

The force, roughly, equals the 36,000-foot-pound energy jolt which a new Super-Vulcan Model 140-C differential-acting pile hammer delivered 103 times a minute in slamming 16-inch square concrete piles through a ledge of sandstone. The big hammer, reported by Project Manager R. K. Harris of the James I. Barnes Construction Co. of Santa Monica to be the only one of its type in the world, penetrated sandstone ledges up to 6 feet in thickness. It is some of the hardest driving on the west coast.

The sheer power of this big hammer is impressive. Sidewalk superintendents on many a job watch in an interested way as tractor equipment, hoists, and power shovels go about their work. On this job they gaped open-mouthed in a bedlam, as the 14,000-pound striking ram clanged on its steel follower, and made an 8-ton concrete pile dance like a thing alive.

The James I. Barnes Construction Co. built a new $793,500 addition to the Port of Los Angeles, and the big hammer was used to drive 1,203 precast-concrete piles. These piles support the new 2,570-foot concrete dock, 40 feet wide, including the 14-inch fender timbers. Started in August, 1949, the work was scheduled for completion by mid-summer of the 1949 working season.

A special pile driver, the oversize pile hammer, the use of a crawler crane on the pile-driving scow to feed piles to the leads, the development of a new shop-made device to cut concrete piles off to a neat line: these were a few of the unusual things which made the job noteworthy.

Design and supervision of the project is under the general management of the Harbor Commission of the City of Los Angeles, with E. C. Earl of San Pedro as Harbor Engineer.

Harbor Rich With History

The history of the work site is colorful. Back in the days of sailing ships, the vessels used to anchor seaward of the spot where the dock has been built. At that time it was a natural sandstone rock shelf, just about awash at low tide, which extended out beyond Sims Point toward the deeper water beyond Dead Man's Island.

On favorable high tides, the sailing ships would slip in up the site of the present deep-water channel, and anchor in the small inner bay. The first Los Angeles fish cannery was established here. Later, a rough breakwater was built over the shelf, and still later a concrete viaduct was constructed and the land area enlarged. Thirty-five years ago, a timber and creosoted-wood pile dock was built by the Southern Pacific Railroad, and the demolition of this old dock was a part of the Barnes contract.

Since 1900, the ship channel has been dredged full width to accommodate ocean-going vessels. The City of Los Angeles now has plans to enlarge the harbor facilities considerably, and the recent job is a part of that modernization. Until such time as the dock is used by large vessels, it will serve the many fishing boats which use the old S. P. slip.

Design and Planning of Job

The job was a lump-sum contract,
(*Continued on next page*)

C. & E. M. Photo
The Port of Los Angeles dock job is alive with activity as carpenters begin to set falsework and "pile butts" finish cutting off the concrete piles.

ROADSIDE REPORT *by Bert Snooks, owner of the Texas Hauling Company, Houston, Texas, G.V.W. ratings for Ford F-7's and F-8's shown are 19,000 lbs. and 21,500 lbs. respectively.*

"The FORD BIG JOB is more rugged, in my opinion, than any other truck made!"

"I THINK the Ford 145-H.P. BIG JOB is the best all purpose truck on the market," reports Bert Snooks. "I am operating three Ford F-8's and four F-7's with eight-yard bodies. These seven BIG JOBS are doing a better job than fourteen 2-ton trucks with four-yard bodies that I operated in 1947. My Fords have from 15,000 to 100,000 miles and the cost of repairs has been negligible. The Ford BIG JOB is more rugged, in my opinion, than any other truck made."

In terms of *Payload-Performance* the Ford BIG JOBS have no equal in their class. No other truck offers so much payload capacity in relation to chassis weight, with as high a horsepower rating per gross ton. This means bigger payloads within legal load limits. It means faster, more profitable delivery of big loads. Ford's high *Payload-Performance* is evidence of Bonus Built construction. Each of over 150 Ford Truck models is Bonus Built . . . built extra strong to last longer.

FORD 1948 *Bonus Built* TRUCKS 1955

BUILT STRONGER TO LAST LONGER

USING LATEST REGISTRATION DATA ON 6,106,000 TRUCKS, LIFE INSURANCE EXPERTS PROVE FORD TRUCKS LAST LONGER!

ONLY THE FORD BIG JOB HAS ALL THESE FEATURES

- ★ New 145-h.p. Ford V-8 engine for top performance.
- ★ Ford concentric dual-throat carburetor for more power, more economy.
- ★ New heavy duty 5-speed transmissions—overdrive or direct-in-fifth—for operating flexibility.
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Gross Vehicle Weight ratings: F-8 up to 21,500 lbs., F-7 up to 19,000 lbs. Gross Combination ratings: F-8 up to 39,000 lbs., F-7 up to 35,000 lbs.

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C. & E. M. Photo
In this view of pile driving on the Barnes Construction Co. dock job, we see how the pile-driver leads could be adjusted to drive a batter pile.

Massive Pile Hammer Drives Through Rock

(Continued from preceding page)

including 1,203 piles, about 30,000 total yards of riprap handling, and the placing and furnishing of concrete and reinforcing steel for the structure. Ceco Steel Products Co. furnished the steel under a subcontract, and Dragline Rentals, Inc., of Long Beach subbed the riprap work. The plumbing firm of Hickman Brothers had the dock plumbing, and electrical installations were put in by Hoffman & Jacobs.

The piles, 16 inches square, are from 41 to 64 feet long. They were precast by Warren-Southwest, Inc., for the City, and furnished to the job from the Warren-Southwest yard on the waterfront in West Basin.

Plans called for tip penetration to minus 32 on the inner row, minus 50 on the outside, with a regular step-down in between. The piles were driven in bents of six vertical piles 14 feet apart, with the piles 6 feet 4 inches apart in the bents. Alternate bents have an extra pile, driven on a 7:12 batter to the inside, reinforcing them. The head of this pile matches the alignment of the tops of the vertical piles, and only 3 inches was allowed in the reinforced-concrete pile cap to catch the pile heads. Considering what lies underneath, it was not an easy pile-driving assignment.

Top elevation of the concrete deck is plus 14.00 on the inshore edge; 13.75 on the seaward side. This permits surface water to drain off. The concrete deck is 7 inches thick, covered with a 2-inch wearing surface of asphaltic concrete. Along the shoreward edge a concrete rat-proofing mat extends from minus 2 to plus 3. A concrete gravity-type retaining wall tapering from 4 feet to 1 foot is set back of the rat-proofing mat to hold the sand backfill. Later on, after the area is backfilled and dressed, a 5-inch asphaltic-concrete roadway will be laid over the area—still under the Barnes contract.

The job shaped up almost automatically into this sequence: (1) Wreck the old dock and remove existing riprap. (2) Drive concrete piles, trim, and place wales. (3) Replace riprap. (4) Pour the rat-proofing mat. (5) Build a retaining wall back of the rat-proofing. (6) Form and pour the deck concrete. (7) Build mooring fenders. (8) Backfill, paving, and cleanup.

Old Work Is Wrecked

For many years the existing Southern Pacific dock had been rotten, unsightly, and a fire trap. It was wrecked by Barnes, using a Model 585 Link-Belt Speeder.

The old structure was wrecked by hooking cables to the deck and pulling whole sections off at once. Occasionally the cables could be wrapped around the entire dock section, if it was rotten enough, and a pull would wreck a great deal of the timber. Most of this rotten deck lumber was piled up and burned in great bonfires.

Salvageable timber was largely limited to the 4 x 12 deck sills, and these timbers were stored to one side to be used later on in the job as wales for the temporary falsework. Some of the old creosoted piles were also salvaged, but they hardly paid for the cost of loading them out.

From 8 to 15 feet of old riprap rock protection also lay under the dock. This was removed by a Lima 1201 dragline, using a 3½-cubic-yard bucket on a 70-foot boom. To reach all of the riprap the bucket had to go out 65 feet from the shore, and scrape down to a sloping sandstone shelf left long ago by dredging operations.

The riprap was stockpiled near by, by casting, leaving only a narrow road along the shore. Working room was very difficult to make, since the dock lies very close to the existing concrete viaduct extending south of Sims Point.

C. & E. M. Photo
This close-up of the Super-Vulcan Model 140-C pile hammer shows its huge size compared to the men.

Pile Driving

Special pile-driving equipment was designed and built for this job. The equipment was all self-contained on a floating 34 x 110-foot steel barge, and it incorporated the out-of-the-ordinary practice of using a crawler crane on the barge, between the pile driver and the boiler, to handle the heavy 6 and 8-ton concrete piles.

The front end of the barge was taken up by the special skid-rig pile driver. It was designed very heavy, so the rig could drive a batter pile without the center of gravity changing the barge draft appreciably. The skid rig was mounted on heavy 16 x 18-inch steel I-beams which overhung the front of the barge by 10 feet. A center pin held the rig in position to the barge, and 4

(Continued on next page)

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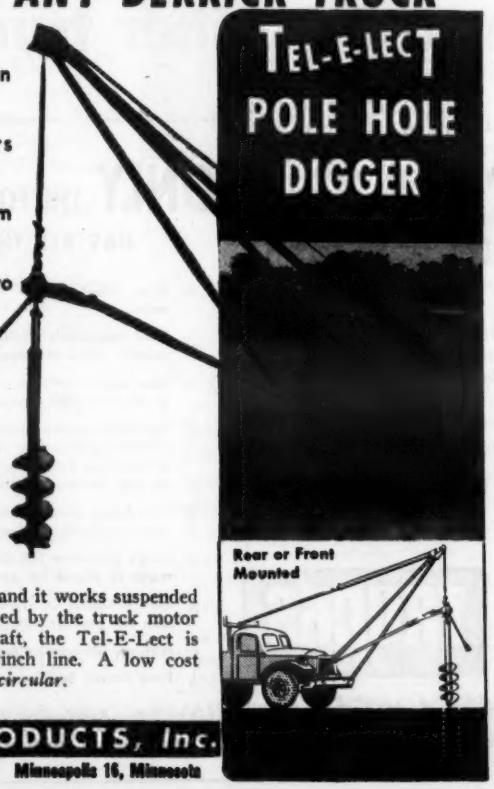

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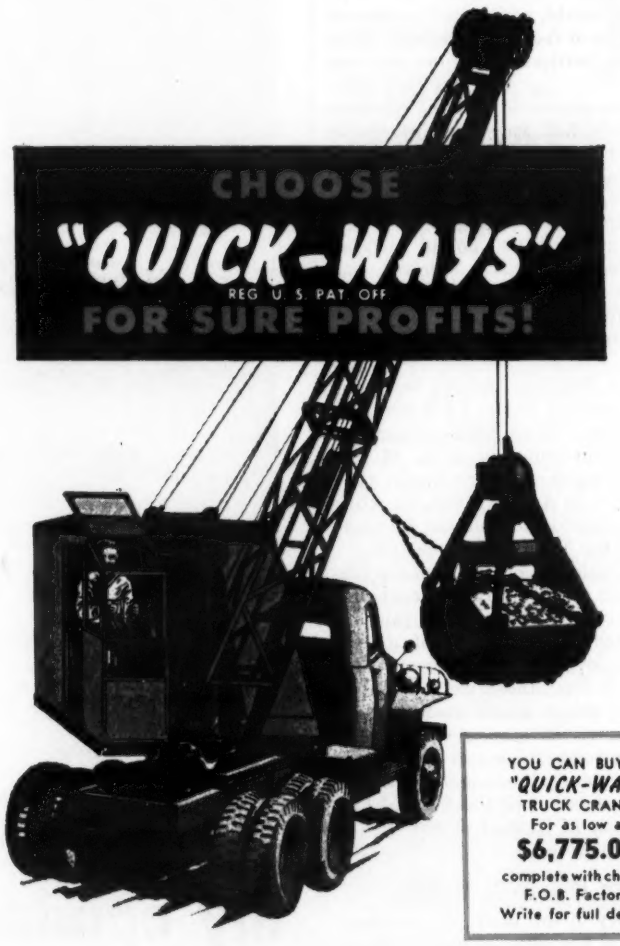

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Parts are rugged and simple, requiring a minimum of servicing and having proved ability to take a life long beating. Many *interchangeable parts* and easy accessibility simplify maintenance and repair. From engine to attachment, every "QUICK-WAY" part will deliver its capacity rating and more.

The essentials built into every "QUICK-WAY" mean sure profits on a small investment; economical to buy, economical to use, it's one of the most useful machines you can own. There's a "QUICK-WAY" owner near you; ask Him.

MODEL E: 4/10 cu. yd. cap., mounts on any standard 5-ton truck.
MODEL J: ¼ cu. yd. cap., mounts on any standard 1½-ton truck.

"QUICK-WAY"
TRUCK SHOVEL CO., Denver, Colo.
WORLDWIDE DISTRIBUTOR SALES AND SERVICE
PIONEER IN POWER SHOVELS FOR TRUCK MOUNTING AND STILL THE LEADER

tons of concrete counterweight under the hoist engine helped to keep it steady with its own weight.

The 75-foot-high steel leads were pinned three-quarters of the way up to a steel A-frame top. By moving the A-frame back or forth on a center track, the leads could be battered at will. A-frame movement was achieved by two 15-ton Beebe hand crab winches, driven through a set of old truck drive gears with two 10-hp electric motors. The gear ratio was almost 900 to 1.

Sidewise batter could be achieved by moving the barge to one side and holding it, or by skidding the rig itself. The rig had 45 degrees of play available if necessary. On this job, it was not necessary to use it.

Inside the leads was the Super-Vulcan 140-C differential-acting pile hammer, whose power and weight are truly remarkable. Its 14,000-pound ram has an effective stroke of 15½ inches, equivalent to a free fall of 2.57 feet. It has a gross weight, without follower, of 27,984 pounds, an $\sqrt{EW}$ rating of 22,449, and is 12 feet 3 inches high. The terrific power of this hammer can best be illustrated by an incident which happened inside the follower assembly.

The heavy follower, designed to cushion the heavy shock of the blow somewhat and to hold the hammer off the reinforcing steel of the concrete piles, had a variety of cushion material inside. In one spot were 1-inch-thick steel plates 16½ inches in diameter, separated by asbestos sheet packing. The hammer had worked only a few shifts until it increased the diameter of the heavy steel plates to 17½ inches, making it necessary to burn them out of the follower.

Also mounted on the leads framework was a 6-inch water jet pipe. A 3-stage Pacific pump with a capacity of 1,200 gpm at 250-pound pressure furnished the water to this jet. It was driven by a twin battery of General Motors diesels.

Other auxiliary equipment at the leads consisted of a 12-inch H-beam steel spudding pile, heavily reinforced. It had an open skirt bottom to catch, hold, and drive true through sandstone or boulders. The spudding pile was used to punch a hole through rock formations ahead of the concrete pile.

The main hoist for the pile driver was a 9 x 10 Mundy 3-drum unit, steam-powered from the boiler. The anchor winch was mounted off to the port side of the pile driver. It was a 3-drum 7 x 12 Mundy, with a 2-drum American hoist set directly in front and hooked to the Mundy gears by means of a chain drive. The anchor winch handled the jet and the four anchor lines which came off each corner of the rig.

A 140-hp Willamette boiler of the vertical type, with double extension firebox and oil-fired burners, furnished steam power to the rig. Three fuel-oil tanks and a boiler feed-water storage tank were mounted on the stern end of the barge.

C. & E. M. Photo

Barnes Construction Co. workmen are busy with pneumatic guns, trimming up the concrete piles of the dock at the Port of Los Angeles project.

A Pile Is Driven

The piles were driven by working a length of 12 bents and driving until this was finished. The inshore row was, of course, driven first; then the men and rigs came back on the second row, and so on until the seaward row was driven. Horizontal station distances were established on shore and precise hubs driven. The location of each bent was thus controlled by a surveyor and a transit. The distance between piles in each bent was controlled by measuring out from the transit with a calibrated

(*Continued on next page*)

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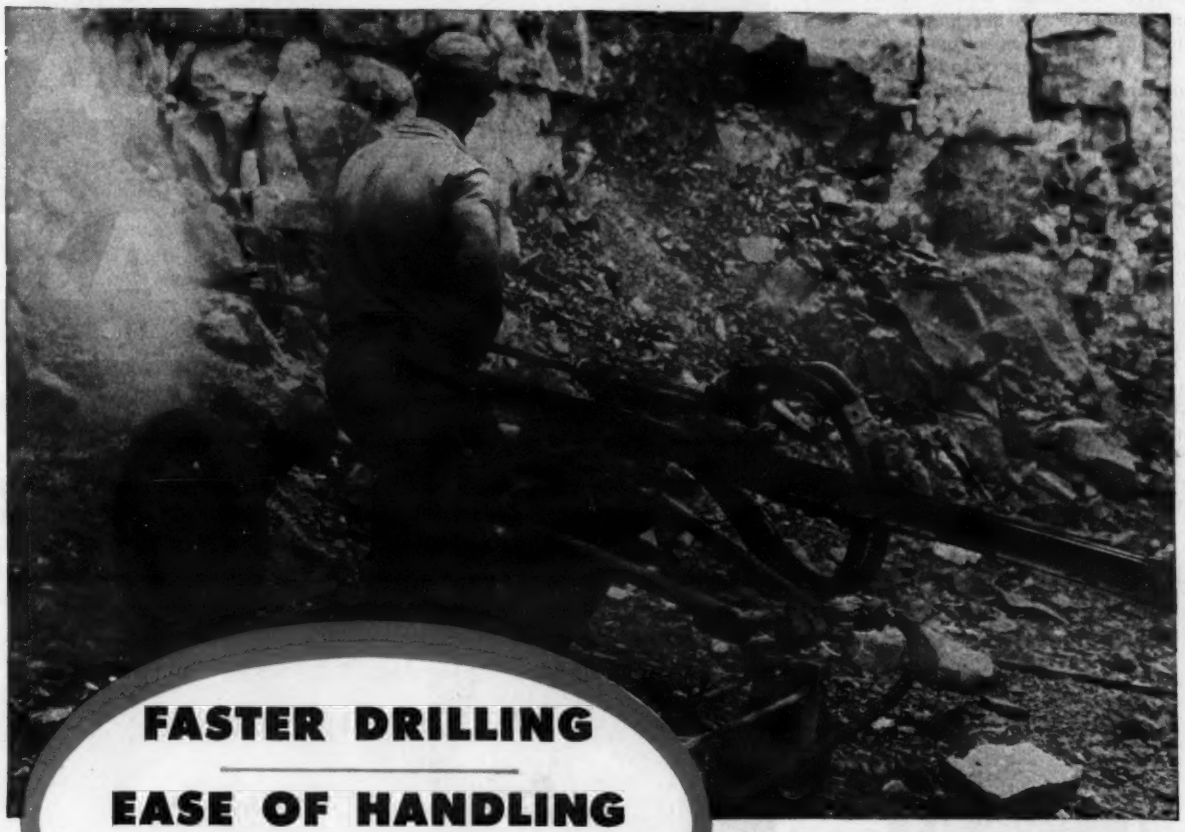

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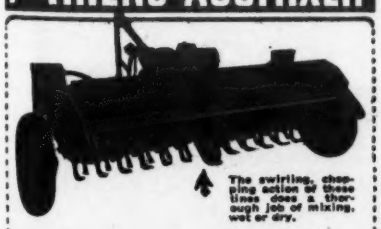

The swirling, chopping action of these tines does a thorough job of mixing, wet or dry.

HERE'S equipment designed especially for mixed-in-place construction—to operate in connection with other general purpose equipment. Whatever aggregates are used it thoroughly pulverizes, mixes and aerates aggregates with binder—rapidly and economically. Also ideal for soil cement stabilization. Safe . . . made 4 standard sizes, 4', 5', 6' and 7'. Write for details.

ARIENS COMPANY BRILLION WISCONSIN

Massive Pile Hammer Drives Through Rock

(*Continued from preceding page*)

wire.

The concrete piles came out to the job by barge, usually in loads of 24, three tiers high. The Link-Belt Speeder 585 crane picked a pile up with two load lines, each attached to a cable bridle to distribute the weight evenly. When the pile was about 40 feet off the barge, the load line controlling the top of the pile was held, while the other was slacked off. This latter line then slid down off the tapering lower part of the pile and was soon free.

The pile was then fed direct to the pile-driver leads by the crane. The transfer of load was made by the pile-driver leadsman, who simply hooked a clevis on a 2-part load line on the pile driver through the cable eye of a soft cable sling previously attached near the top of the pile. He then blew a whistle, the pile driver picked up the load, and the leadsman disengaged the crane clevis. The whole transfer was only a matter of minutes. It was quite efficient.

Special plywood cushion blocks, which had also been jig-bored to act as a template, were set in place at the tips of the steel reinforcement in the pile. This permitted the hammer follower to be easily lowered so the pile would bell and the reinforcing rods extend up the follower holes properly. These blocks were about 3 inches thick, and they prevented excessive cracking of the concrete pile heads under the brutal punishment of the big hammer. The point of the pile was set on the bottom to bell the hammer, after which the hammer and pile were both picked up together while the rig was spotted.

Either a jet hole in sand, or a steel spud pile hole through rock, always preceded the setting of a concrete pile. Holes were successfully spudded through 6 feet of sandstone. It was of course very hard to remove all the old riprap, and this too was hard to penetrate with precision. Thanks to the heavy pile hammer, it was done successfully.

Once the pilot hole was spudded or jetted, driving was easy. In the early part of the job the pilot holes filled with sluffed-in riprap and sand, and driving was very difficult. Thirty-five blows per foot was considered refusal. Penetration was more important here than

C. & E. M. Photo
Out on the dock job are, left to right, B. W. Kuhn of Dragline Rentals, Inc., Project Engineer J. L. Pierson, and General Superintendent Harry Erickson.

bearing, because of the difficulty of penetrating the excellent bearing-value sandstone. However, where bearing was used, calculations were made on the basis of the formula:

$$L = \frac{2E}{S + 0.1\left(1 + \frac{P}{R}\right)}$$

L equals bearing, E equals the energy rating of the hammer, P equals the weight of pile, and R the weight of the hammer ram.

Special Trimming Device

In some sections where piles were driven to refusal, they stuck up above the grade line. It was of course necessary to cut them off to grade, which was a complicated process, because the piles were reinforced with straight and spiral steel.

Some work was done along this line by drilling jackhammer holes near grade and shooting them with powder. But the best solution seemed to be a

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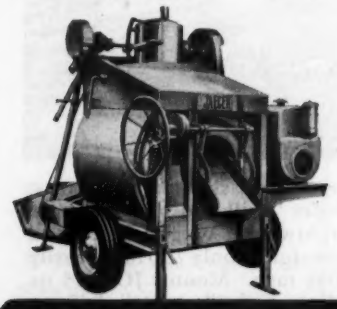
to cut the cost of your concrete work



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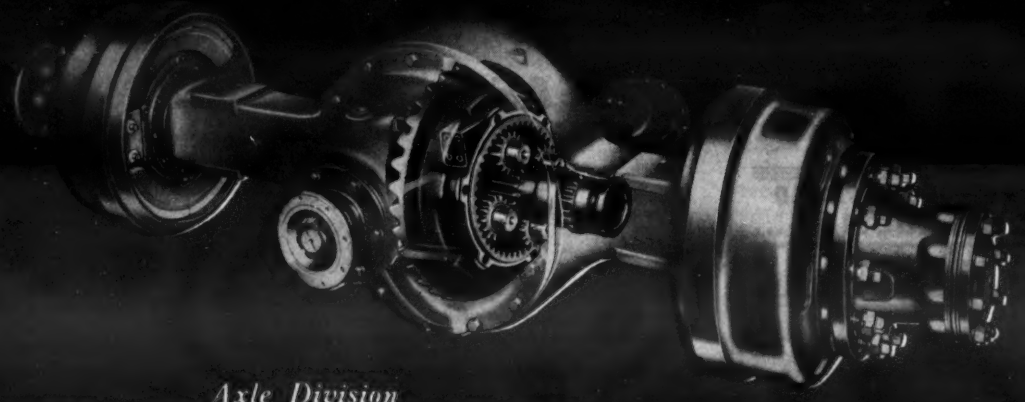

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new device which very neatly cracked a concrete pile off at grade in about 5 minutes.

The device was about 4 feet high. It consisted of a steel H-beam frame which which fit snug over the pile, with a knife-edged blade on the back. On the front, opposite from the blade, and at the top of the frame, was a 35-ton hydraulic jack. The device was simply lowered over the pile by a small Browning truck crane, the knife edge stopped at the grade mark, and pressure applied to the hydraulic jack. It worked somewhat like a flexural beam testing machine in a big concrete laboratory, and the combination of leverage and hydraulic pressure was sufficient to snap the concrete off in a satisfactory manner.

The concrete above the break could then be quickly shot or gadded away, the steel burned off about 2 feet above the pile top, and the pile made ready to cap.

Wales, Falsework, and Forms

Falsework consisted of double 4 x 12 timber wales bolted through from both sides of the concrete pile bent. These timbers extended well outside the dock line, in order that a walkway could be suspended and the outside concrete forms easily hung. These wales carried the main weight of falsework and concrete, so they were further tied up by running a 3-inch strap of 1-inch steel over each pile top, and attaching it to the wales by a ¾-inch bolt on each side.

On top of the wales a set of 4 x 6 leveling timbers was placed, with wooden leveling wedges. Six sets of triple 4 x 12's crossed longitudinally between each bent to support the deck forms.

The deck forms, as well as the timbers and all other panels, were prefabricated in the job carpenter shop and set in place in the structure. Deck forms consisted of 2-inch shiplap lumber, nailed to 2 x 4 studs on 15-inch centers. The rib spaces between forms were held apart by concrete block spreaders, and the forms were held together by steel form-tie bolts spaced on 36-inch centers. The forms were so set up that large 350-cubic-yard pours could be made.

The form panels for the gravity-type retaining wall were faced with ¾ plywood. All panels were set in place and handled by the Browning truck crane.

Some of the riprap had to be replaced before the forms were set. This was done by a Northwest Model 80 machine, using a 7-ton Blaw-Knox clamshell bucket. The riprap was placed initially up to the minus-1-foot elevation mark. Later on, after the concrete was finished, the rest was placed. About 15,000 cubic yards of new riprap was required, and arrangements were made to get this material from a breakwater quarry on Santa Catalina Island.

This quarry is operated by Kiewit-Case-Connolly in connection with present breakwater work for the Corps of Engineers. The new riprap was hauled in by barge and unloaded by clamshell.

Concrete Work

All concrete was supplied, batched, mixed, and delivered to the job by Azusa Sand & Rock Co. from its Torrance plant. Truck-mixers delivered concrete to the job, where it was transferred to the work in 2-yard Gar-Bro buckets handled by the 80 Northwest.

The first concrete work was on the rat-proofing mat. By using a stiff mix, the contractor prevented excessive over-run here, because this strip was not contained by forms. By picking a minus-1-foot tide for pouring, very little concrete had to be placed in the water.

The retaining gravity wall came next, and was poured the same way except that this was carefully formed. Electric vibrators consolidated the concrete as it was dumped, and the forms were stripped and re-used in a few days.

The deck pours were big. The first pour, a 370-yarder, was made in a flat 6 hours. A screeded, rodded finish was sufficiently good on the deck concrete, since it was covered later on by asphaltic concrete.

Altogether, the dock job was chock-full of surprises, hard knocks, tough sandstone, and special problems, most of which yielded to the field construction solutions which the boys dreamed up.

There were thrills, too. Like the time one day the leadsman called for the hammer. Just as the engineer started to lower away, the brake band and hammer dog bolts snapped loose. In less time than it takes to tell, the 14-ton hammer was loose and screaming down through the leads. With a 6-part hook-up on the hammer, the hammer drum was fairly smoking.

Desperately the engineer tried to stop the heavy hammer with his hoist friction. He might as well have snapped his fingers. It looked like $18,000 worth of pile hammer, and maybe a hoisting engine and a 13-man crew with it were headed for the bottom of the bay.

High up on the landings the two leadsmen coolly watched the hammer hiss down. They never faltered. They kept their pry bars in position; the big concrete pile in belling position. With a crash the hammer hit and smashed the steel in the pile top flat. But it stopped, and that was the main thing. For these men, high up over the water, it was all part of the day's work.

Field work for the Barnes company was directed by Project Manager R. K. Harris, and handled by Superintendent Harry Erickson, Engineer J. L. Pierson, who was Project Construction Engineer, with Bill Brandon in charge of forms and concrete. Leo Davis and Lloyd Darnell were Pile Driver Foremen, and Hoke Dillon was the Master Mechanic.

Working 8 hours a day 40 hours per week, these men with their crews built a fine new addition for this important west-coast harbor.

Careful regular maintenance keeps your machines working profitably.

New Operating Advantages
FOR USERS OF CHRYSLER INDUSTRIAL ENGINES EQUIPPED WITH
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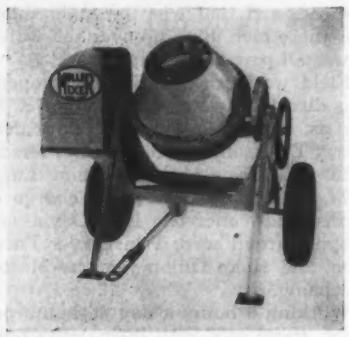


The Muller tilting concrete mixer has a capacity of 3½ cubic feet.

New Concrete Mixer

A 3½-cubic-foot tilting concrete mixer, of the end-discharge type, is being manufactured by Muller Machinery Co., Metuchen, N. J. This unit provides for discharging directly into the forms.

Powered by a Model 9R6 Briggs & Stratton air-cooled gasoline engine with the latest starting features, it is driven by a heavy roller chain on cut tooth sprockets. Disk wheels are equipped with Timken bearings and 5:50 x 16 tires. Two supporting legs are designed to give a stabilizing four-point suspension which prevents twisting strains. In towing, the large wheels and 56-inch wheelbase are said to permit high speeds without danger of tipping.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 33.

Booklet on Steel Forms

A complete discussion of steel forms for concrete has just been released by Irvington Form & Tank Corp., Irvington, N. Y. The company states that the booklet is thorough and sound from the point of view of a construction engineer or builder, yet is so written and compiled that its data are valuable to the architect and designing engineer as well as the construction man.

Full instructions on how to erect steel forms, graphically illustrated by diagrams and photographs, are included in the catalog. Blueprints for the use of forms in special applications, and of the various form accessories, with text comments are also found in the pamphlet. A data-securing questionnaire is enclosed to help Irvington staff engineers make suggestions on special jobs.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 31.

Data on Universal Joints

A series of bulletins on universal joints are available from Blood-Brothers Machine Co., Division of Standard Steel Spring Co., Allegan, Mich. They treat applications, care and repair, and the various series of universal joints produced by the company. They illustrate typical installations of the joints as well as their design and construction.

Complete specifications, photographs, and engineering drawings are included in the catalogs on the N Series needle-bearing assemblies; BW Series universal joints and propeller-shaft assemblies; and on the K, 1FR, 3DR, L10S, L14S, and L16S Series of universal joints.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 79.

Concrete-Curing Compound

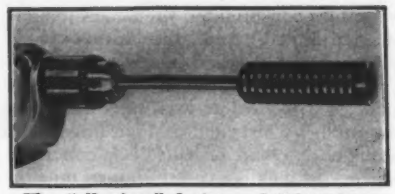
A folder on the four Sealtex concrete-curing compounds is available from The Techkote Co., 821 W. Manchester Ave., Inglewood, Calif. The catalog describes these products, and illustrates on-the-job applications.

Sealtex clear contains a fading dye which marks the areas treated to avoid excess coverage and waste. The white-pigmented compound is designed to reduce heat absorption from the rays of the sun. The gray-pigmented one prevents glare and yet retains reflectivity. Sealtex black was developed for economy where finished concrete work and heat absorption are not important factors.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 51.

Rotary Core Drill

A new type of rotary core drill has been added to the line manufactured by the Concrete Termite Rotary Drill Co., 2082 Foothill Blvd., Pasadena, Calif.



The "all-worm" feature of this rotary core drill carries pulverized material away from the tip. Concrete Termite Rotary Drill Co. makes the unit.

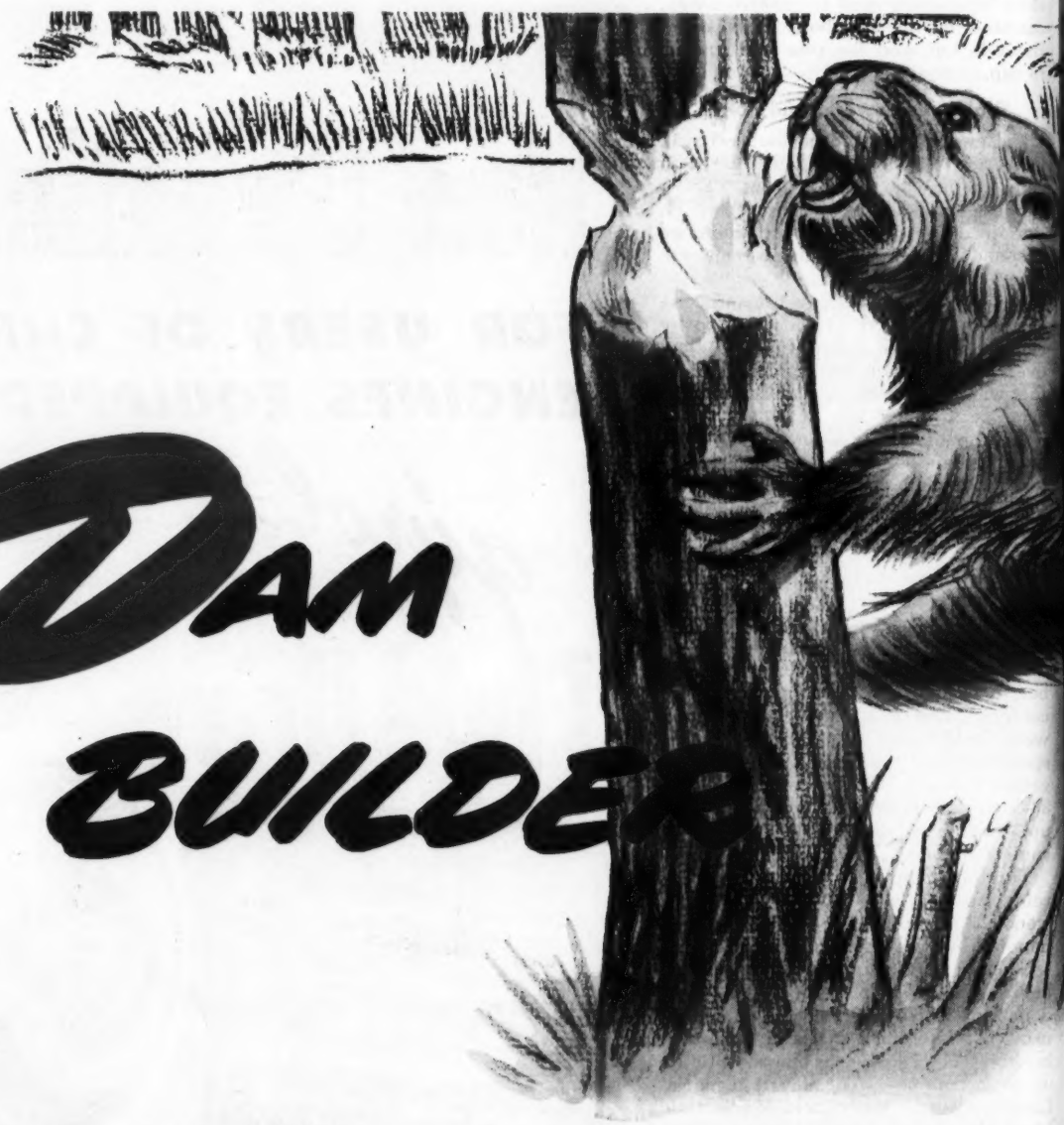
Each core has the "all-worm" feature which starts immediately to carry the pulverized material away from the tip. This means reduced friction, the company explains, and less heat generated. Core drills are available in sizes from 1 to 2½-inch diameter.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 92.

Derricks, Hoists, Winches

A fully illustrated 16-page catalog on gasoline, electric, and hand-powered derricks, hoists, and winches has been released by the Sasgen Derrick Co., 3101 Grand Ave., Chicago 22, Ill. It includes complete specifications and recommends uses for Sasgen material elevators and hoisting equipment, swing-stage scaffold winches, truck derricks, blocks, and sheaves. Photographs and drawings illustrate almost all models of the equipment.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 56.



DAM BUILDER

Matchless ability to hang on to a load and put dirt where you want it *fast*—that's the kind of performance you get from International Diesel Crawlers on any earthmoving job. *Built to outperform*, to dig in and do, with diesel power that *exceeds* today's exacting requirements!

Quick to get to work; with in-built, all-weather starting—and quick to do the work; with 8 speeds ahead, 8 in reverse and finger-tip speed and steering control—International TD-24 turns in record after record of unbeatable work performance.

On dams for soil conservation as well as the great flood-control and hydro-power earthworks, this modern, diesel crawler is the tractor to use for all your tough jobs. Contact your International Industrial Power Distributor for TD-24's now.

INTERNATIONAL HARVESTER COMPANY
CHICAGO

Standardize on Power that Pays

CRAWLER TRACTORS • WHEEL TRACTORS • DIESEL ENGINES • POWER UNITS

New 50-Gal. Kettle For Joint Compounds

A new 50-gallon kettle for heating and melting rubberized-asphalt and other joint-sealing compounds has been introduced by the Aeroil Products Co., Wesley St., South Hackensack, N. J. Modeled after the 120DVP, the kettle is designed for small jobs and maintenance work.

The 50DVP is constructed on the double-boiler principle with a multiple oil-bearing tube system running through the melting compartment for uniform heating and speed in melting. Approximately 40 gallons of heat-bath oil are required for both outer vat and tube system.

The new kettle is fired by a single

Aeroil's new 50-gallon kettle is designed for small jobs and maintenance work.

L.P.G. burner with an average consumption of 21 cubic feet per hour, the company says. The 50DVP is available either on a pneumatic-tired trailer or on skids for mounting on a light truck.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 124.

Folder on Sand Spreaders

A catalog on the Humphrey sand spreader is available from the Charles N. Wood Co., 570 Arsenal St., Watertown, Mass. The catalog describes the sand spreader as safe, because it is controlled entirely by the operator in the cab; fast, because it is operated at normal truck speeds; and positive, because it is fully power-operated.

The hopper body of the spreader has a capacity of 10 tons of sand. An agitator and two paddle shafts feed the sand to a spreader at the rear of the truck. An oscillating paddle throws the sand right and left across the road.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 70.

Now available are three new Buffalo-Springfield variable-weight tandem rollers—the KT-14, KT-19, and KT-20 with weight ranges of 5 to 7, 8 to 12, and 10 to 14 tons respectively.

New Tandem Rollers

Three new variable-weight tandem roller models—the KT-14 with a weight range of 5 to 7 tons, the KT-19 from 8 to 12 tons, and the KT-20 from 10 to 14 tons—are manufactured by The Buffalo-Springfield Roller Co., of Springfield, Ohio.

Furnished with either gasoline or diesel engines, the new models have many of the basic features of the B Series or heavy-duty Buffalo-Springfield tandems. A gear-type oil pump supplies the low-pressure hydraulic steering system, while two low-torque clutches permit reversing the roller without shifting gears. Side air intake for the engine, and an all-welded frame are other features. A self-energizing hand-operated scarifier is available as optional equipment.

Further information may be secured from the company by requesting Catalog S-57-49. Or use the Request Card at page 16. Circle No. 14.

Folders on Snow Plows

Catalogs on Ross snow plows are available from The Burch Corp., of Crestline, Ohio. They cover the V-type with side wings and the one-way with side wings.

These folders are fully illustrated and include complete specifications for the plows and wings. The Ross snow plows are recommended by the company for use with four-wheel-drive trucks of 3½ to 5-ton capacity. The bulletins point out that both the plow and the wings are designed with Sno-Flo moldboards for lower surface resistance. The wings are hydraulically operated. Snow-plow wings are also available for use with Galion motor graders.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 36.

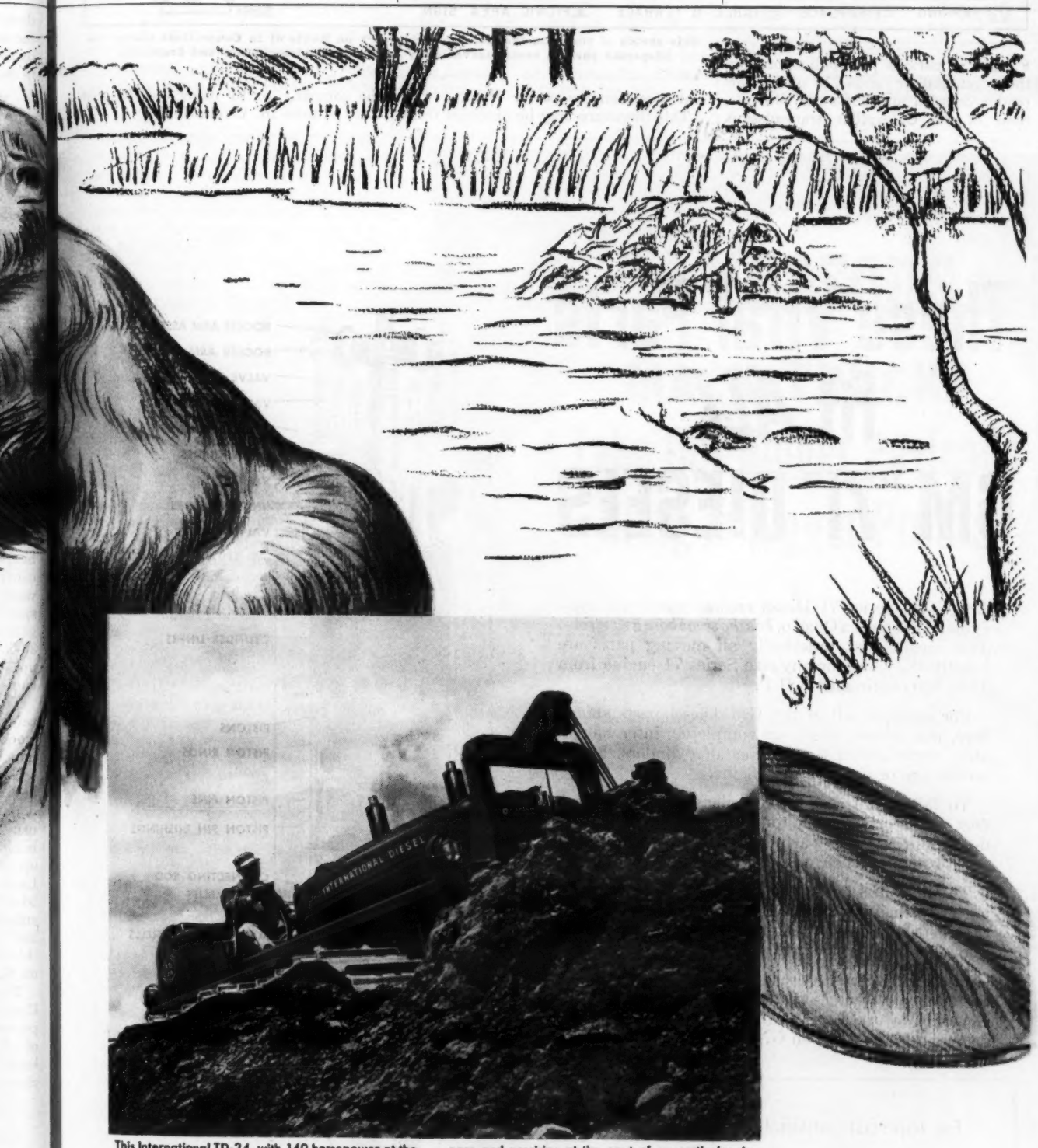
Crushers and Pulverizers

Two catalogs on jaw crushers and on impact breakers and pulverizers are available from Eagle Crusher Co., Inc., 900 Harding Way, Galion, Ohio.

The first is a broadside describing the company's Models 10-16, 10-20, 10-36, 18-36, and 20-36 jaw crushers. The model number in each case indicates the size of the jaw opening. These crushers are designed for use with trucks, tractors, and trailers, or as independent units for roadside, portable, or stationary crushing. Photographs are included and complete specifications are listed for all models and types.

The second, a folder on the single-unit impact breaker and pulverizer, describes the unit's ability to reduce rock through a range of 6-inch stone to powder-like dust. Two models, the 12-16 and the 12-24, are available, to give a capacity up to 25 tons per hour depending on thickness of the bar spacers. Dimensions and specifications are given for both models.

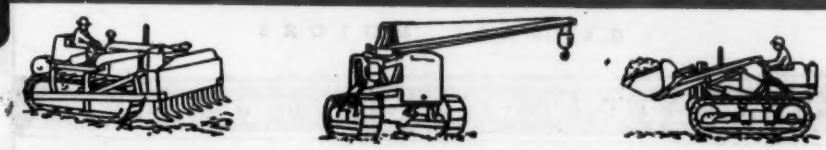
This literature may be obtained from the company, or by using the Request Card at page 16. For the folder on jaw crushers, circle No. 29; for the folder on the impact breakers and pulverizers, circle No. 30.



This International TD-24, with 140 horsepower at the drawbar, delivers a bladeful of heavy clay with ease and precision at the crest of an earth dam in Illinois. Increase your work capacity with a TD-24.

INTERNATIONAL HARVESTER

INTERNATIONAL INDUSTRIAL POWER



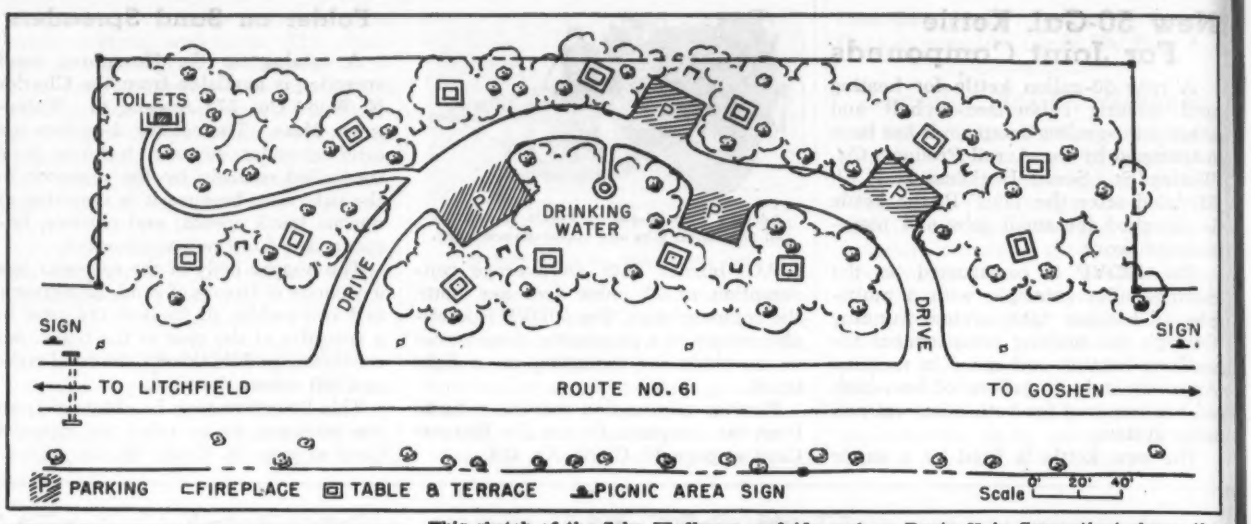
The Parking Problem In Roadside Parks

Provision of picnic areas and roadside parks along the highways is a driver service which has been enthusiastically welcomed by the motoring public. Records of their use and the many letters received by state highway departments attest to the public's appreciation of the pleasure, convenience, and safety afforded by such wayside areas.

Careful planning goes into the selection of the sites, and the layout and choice of the facilities with which they are equipped. However, in many cases, the convenience in the location of fireplaces, picnic tables, etc., is offset by the fact that the parking area is apart from the wayside proper, and it is therefore necessary to tote baskets of food and other paraphernalia a considerable distance.

In the planning of roadside parks in Connecticut, it has been found that, in most cases, service roads can be built through the wayside areas at very reasonable costs. At selected locations along these service drives, a number of small parking spaces, accommodating from one to four cars, may be located. Picnic tables and fireplaces can then be placed near the parking area, and users of the wayside may have their cars convenient to the facilities.

The accompanying sketch shows the layout of one such roadside park in Connecticut, in which this idea has been incorporated. It has been in use for over eight years, and, it is reported, has functioned very satisfactorily. Wherever acreage and topography permit, the Bureau of Roadside Development plans to include service roads and parking areas in all future roadside parks in Connecticut.



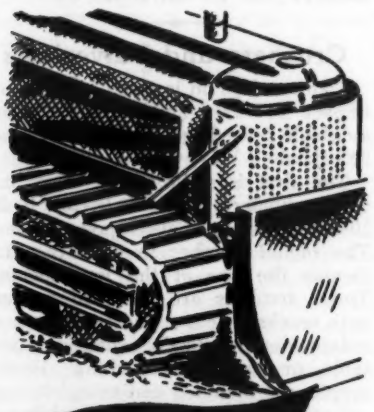
This sketch of the John Wadhams roadside park on Route 61 in Connecticut shows the dispersed parking areas, conveniently located near picnic tables and fireplaces.

Motor-Grader Booklets

Two new booklets on motor graders have been issued by the Caterpillar Tractor Co., Peoria 8, Ill. Their adaptability to various methods of road maintenance the year round is featured in a 16-page booklet called "Cat Motor Graders Do the Job". The booklet shows Caterpillar graders doing precision ditching, shaping banks, handling general road maintenance, mixing road surfaces, terracing, and removing snow; it also cites performance records on these projects.

The second booklet, called "Contracting With Cat Motor Graders", tells in 8 pages of various job applications for these maintainer units. It offers the reader detailed and cut-away illustrations of the Caterpillar transmission and diesel-engine power plant.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 15.



INCREASE TRACTOR Power!

• Worn grouser shoes, retipped with BULLDOG TRACTOR GRIP-LUG provide deep-biting traction on any terrain . . utilize full engine power . . save time, fuel and often contracts! Write for complete information, or contact your equipment dealer for details.

Sole Producers
ALLIED STEEL PRODUCTS, INC.
7831-35 BROADWAY CLEVELAND, OHIO

These Vital Parts fit *ALL* GM "71" DIESELS

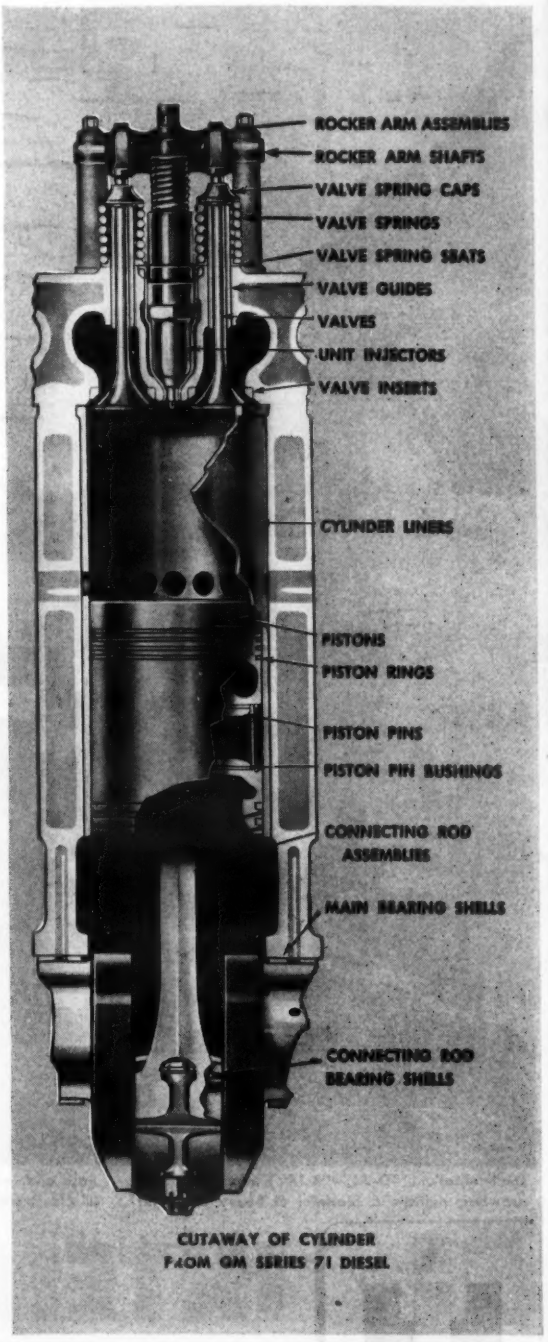
Every GM Series 71 Diesel engine, whether a two-cylinder or one of a Quad 6, *has the same bore and stroke.* This means that practically all moving parts are exactly the same for any size Series 71 engine from 43 to 520 continuous B.H.P.

For example, all of the GM Diesel parts shown here, plus dozens more, are completely interchangeable, regardless of the number of cylinders, horsepower, age or usage of the engine.

To large contractors, oil drillers, truck or boat fleet operators, this unique feature of GM Diesel design means lower parts inventories and less time out for maintenance.

To the individual owner, it brings a no less important benefit. A *single* inventory of basic parts on the distributor's shelves increases the availability to owners of the *right* part when it is needed.

Maximum parts interchangeability is just one of the many *plus* values that go with your purchase of General Motors Diesel engines—a good reason why it pays to *standardize* on GM Series 71 Diesels.



CUTAWAY OF CYLINDER FROM GM SERIES 71 DIESEL

For topmost satisfaction and reliability, always buy genuine "Factory-Engineered" GM Diesel parts from your authorized distributor or dealer.

DETROIT DIESEL ENGINE DIVISION
SINGLE ENGINES...Up to 200 H.P. DETROIT 28, MICHIGAN MULTIPLE UNITS...Up to 800 H.P.
GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK

GM GENERAL MOTORS DIESEL POWER

Latest addition to the Timberhog line of portable power saws is this 36-inch gasoline-driven chain saw.

A 36-Inch Chain Saw

The latest addition to the line of Timberhog portable power saws is a 36-inch gasoline-driven chain saw especially designed for cutting heavy timber. The Timberhog line is manufactured by Reed-Prentice Corp., Dept. H-39, 677 Cambridge St., Worcester 4, Mass.

Powered by a two-cycle 4.2-hp engine, the two-man Timberhog 36 features an anti-friction ball-bearing idler, at the helper's end, which is designed to provide greater use of the horsepower produced and to insure faster cutting. Compact design and die-cast aluminum parts result in a weight of 65 pounds.

Reed-Prentice states that the diaphragm-type carburetor enables the saw engine to operate in any position without stalling; and that the narrow guide bar, exclusive with the 36, affords fast and efficient cutting because it reduces binding.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 54.

New 200-Amp Welder

A new ac transformer arc-welding machine, known as the Wilson 200 amp maximum MCT, has been announced by Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. This portable welder is designed specifically for use by small shops, garages, and maintenance crews. It has a rated output of 200 amperes and is completely self-contained.

It is said to offer the following features: a welding range divided into two scales of current adjustment with stepless control through each scale; capacitors supplied in the secondary circuit to provide easy arc starting and arc stability; built-in capacitors in the primary circuit to provide power-factor correction; and windings that are fully insulated with heat-resistant spun-glass fiber. A primary "on and off" switch and a 10-foot length of three conductor rubber-covered primary cables with lugs attached are included with the machine.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 10.

Folder on Apron Feeder

A 4-page folder on Rogers apron feeders may be secured from the Rogers Iron Works Co., Joplin, Mo. It offers photographs, specifications, capacities, and construction details of the company's line. Rogers feeders are available in four models with capacities from 120 to 225 tons per hour, varying with the width between skirt boards and the depth of the material on the feeder. Six extra-heavy-duty apron feeders are also presented in the catalog.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 55

Stow Co. Personnel Shifts

The following changes in personnel were announced recently by the Stow Mfg. Co., Binghamton, N. Y.: J. P. Dickinson, who has been with the company for 30 years and has been Vice President in Charge of Sales since 1943, has been promoted to Vice President and General Manager. J. L. Dickinson, who has been associated with the company for 14 years and has been Vice President in Charge of Production since 1943, has been made Vice President in Charge of Sales. W. W. Rappman, with the company for 10 years, has been promoted to Sales Manager.

Mobile Steam Generators

A 4-page folder on steam generators for use in pile-driving and extracting operations has been issued by the Cleaver-Brooks Co., 333 E. Keefe Ave., Milwaukee, Wis. The catalog features steam boilers, trailer-mounted for easy towing or skid-mounted for installation on a truck or trailer.

The folder lists the complete specifications for all models, and includes cutaway and on-the-job photographs. It explains that the mobile steam boiler may also be used for asphalt plants, ready-mix concrete plants, winter concrete operations, and for thawing and miscellaneous heating.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 20.

Data on Highway Markers

A 4-page catalog has been issued on the three types of highway markers manufactured by the International Highway Marker Co., 209 S. LaSalle St., Chicago, Ill. The company's Hi-Way markers are available in circular or oval shape, and in plastic or rubber.

The circular markers, made in a standard 4-inch size, come in two styles with drive anchor or Hammerset-type anchor. A feature of this circle is the corrugated under-surface of rubber which comes in direct contact with the pavement and offers a water seal and pneumatic cushion. Other features and specifications for these markers are listed in the folder.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 43.

REX WINCHES *Save you* Time, Money, Labor

JUNIOR TRUCK WINCH
Weight 156 lbs. Ratio 32 to 1
Height 9" Lift 1000 lbs.
Length 36" Width 10"
Plate drilled to fit standard truck frame. Oil sealed bearings, stainless steel brake band. Spool capacity 400 ft. 5/16" cable. Winch runs from power take-off. Sizes 5 to 7½ ton capacity.

JUNIOR COMPOUND POWER WINCH
Weight 140 lbs. Ratio 96 to 1
Length 23½" Lift 1000 lbs.
Height 10¼" Width 10"
Equipped with clutch and brake. Spool capacity 200 ft. ¼" cable. A portable machine. Use with ½ or 1 H.P. Motor. 5 and 7½ ton size.

JUNIOR HAND OR POWER WINCH
Weight 60 lbs. Ratio 32 to 1
Length 12" Lift 1000 lbs.
Height 9" Width 8"
Spool cap. 100 ft. ¼" cable. All gears in oil. Has 3/16 key way for power drive.

JUNIOR POWER WINCH
Weight 76½ lbs. Ratio 32 to 1
Length 13½" Lift 1000 lbs.
Height 8¼" Width 8¼"
Spool cap. 150 ft. ¼" cable. Oil sealed bearings. Write for complete Catalog.

REX MACHINE CO., 1152 Turner Ave., Grand Rapids, Mich.

Inside Reasons Why . . .

MACK TRUCKS
Take Out Bigger Payloads
Bring In Bigger Profits

• In every part, Mack trucks are built to "take it" when it comes to taking out bigger loads with utmost economy!

Here are some of the "inside reasons" why Mack trucks build profits for you by hauling bigger tonnage on faster, uninterrupted schedules.

Massive Frame electrically fused into single unit. Alloy steel bumper and members are reinforced and braced by huge cross members. Capable of carrying great loads and standing up under tremendous shock.

Balanced Bogie for mastery of the toughest terrain. Exceptional flexibility insures equal traction, even tire loading, uniform braking on all four wheels.

Exclusive Power Divider. Delivers torque proportionately to wheels having the most traction. Eliminates dissipation of power in useless slippage and wasteful wheel spinning.

Double Plate Air Assist Clutch. Effortless in operation, reduces driver fatigue, requires minimum maintenance throughout its long life.

IT'S PART OF THE LANGUAGE:
"Built Like a Mack Truck"

Mack Trucks, Inc., Empire State Bldg., New York, N.Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

Houston Plans Big Construction Show

The second Houston, Texas, Construction Industries Exposition will take place in the Sam Houston Coliseum, September 25 through October 2. Those in charge of planning this "world's fair" of the construction industry are out to expand and improve last year's inaugural effort, which drew 335,000 visitors. The Exposition is presented by the Houston Chapter of the Associated General Contractors of America. Guiding the show is the Exposition Policy Committee headed by Russell Nix.

The exposition is designed to inform the general public on every phase of the building industry, at the same time providing good sales opportunities. Plans are all set for displays of special interest. One is the broader Apprentice Training Program, a 1948 feature which drew extraordinary spectator reaction. This year, joint committees of the AGC and the Building Trades Council have arranged for all ten of the building crafts to display on-the-job working methods so that sidewalk engineers can get a close-up of every type of building service. This and many other exhibits will bring dramatic displays of every sort of product and service that goes into residential, commercial, and industrial building.

The majority of the 1948 exhibitors, encouraged by attendance figures and sales results, have signed up for 1949, and many have requested additional booth space. There has also been a steady flow of applications from new exhibitors, the Exposition Committee reports.

In addition to visitors from the construction industry and general public, other specialty groups will attend the exposition. Both labor and building leaders will be in Houston for the September 25th opening. They include representatives of the Building and Construction Trades Department of the A. F. of L., as well as national officers of the AGC. Student engineers, architects, and draftsmen from major colleges and universities in the southwest will attend.

Horace Heidt will bring his nationally known "Youth Opportunity" program, his Musical Knights, and his Sunday coast-to-coast network broadcast to the exposition to headline the entertainment.

Tagline, Four Types

Four types of Tag-Master taglines are made by Morin Mfg. Co., 946 Elm St., West Springfield, Mass. Designed for use on an excavator with boom, they are convertible to a dipper trip for use with a shovel front.

The Type HR, for machines of up to ½-cubic-yard capacity, is said to maintain uniform tagline control from truck level to 60 feet below the machine. The HX has a 75-foot-capacity drum for deeper operating. The BR, for machines with a capacity up to 1½ cubic yards, will maintain control from truck level to 70 feet below the machine. The BX is a tagline for units with a capacity of over 1½ cubic yards, and will maintain control 135 feet below the machines. All types can be used as a bucket trip.

The company states that this tagline permits accurate loading and casting over a 25-foot range without moving the boom or excavator. The tagline drum is installed inside the cab so that there is no extra weight on the boom.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 40.

Carts and Wheelbarrows

A broadside on the Gar-Bro line of carts and wheelbarrows has recently been brought out by Gar-Bro Mfg. Co., 2416 E. 16th St., Los Angeles 21, Calif. Bulletin 74 illustrates fully all models, listing their features, uses, and dimensions. It covers the line of material dump carts, standard concrete carts, acetylene-tank carts, shovel-barrows, and single and double-wheel barrows.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 26.

Textbook on Hydrology

"Hydrology" by C. O. Wisler and E. F. Brater, both of the University of Michigan, has recently been published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y. This textbook and reference presents the fundamental principles of hydrology as they have been developed up to the time of writing. The distribution graph, the unit hydrograph, the theory of infiltration capacity, and many other developments in the field are presented. Procedures for determining minimum flow, long-term average yield of a drainage basin, and the ground-water yield of a given area are also included.

Valuable for solving practical problems in hydrology, the book provides information which can be used in drainage, sewerage, and dam design to determine maximum flood flows. "Hydrology" contains many tables, diagrams, and illustrations which clarify the text material. In addition, the authors list references to current literature which the reader may investigate for further information on particular aspects of the subject.

The price of the book is $6.00.

Ganser Joins Timber Co.

William R. Ganser, Jr., structural engineer, has joined the staff of the Timber Engineering Co. of Washington, D.C. He has previously worked for John N. Spooner & Sons, Inc., of New York City on various harbor construction projects. Mr. Ganser's work with the company will be designing light and heavy-frame timber structures and promoting the use of timber with Government engineers and specifiers.

BE READY FOR THE WORST WEATHER

CHOOSE THE SNOW PLOW TO FIT THE JOB FROM THIS COMPLETE LINE

A-C MOTOR GRADERS with Baker "V" Plows

MODEL	BRAKE HP.	ENGINE
AD-4	104	2-Cycle Diesel
AD-3	78	2-Cycle Diesel
BD-3	78	2-Cycle Diesel
BD-2	50.5	2-Cycle Diesel
D	34.7	Gasoline
W-Speed Patrol	31.5	Gasoline

(Wings available for AD and BD models . . . scarifiers for all models, except W-Speed Patrol, for removing ice. Blade plow also built for W-Speed Patrol . . . and snow bucket for Model D.)

A-C CRAWLER TRACTORS with Baker "V" Plows and Wings

MODEL	DRAWBAR HP.	ENGINE
HD-10	86.63	2-Cycle Diesel
HD-7	60.10	2-Cycle Diesel
HD-5B	40.26	2-Cycle Diesel

(Also: Tracto-Shovel "V" plow and Snow Loader Bucket for HD-5G)

A-C WHEEL TRACTOR with Baker "V" or Blade Plow

MODEL	DRAWBAR HP.	ENGINE
IB	13.5	Gasoline

FOR OPENING HIGHWAYS . . .

. . . it's heavy-duty, diesel-powered Allis-Cha otor Graders and Crawler Tractors with Baker s. A right size to fit your conditions—but not ma- chines. Each model handles light or heavy effi- ciently and economically. Provide instant and operation on diesel fuel! Exclusive tubular A-C Motor Graders absorbs the shocks and strai ome from bucking heavy drifts. Tandem cha and proper weight distribution gives you the tra keep moving through toughest going.

Also available—Baker snow plow for the cost Allis-Chalmers Model D Motor Grader sive tandem drive. Gasoline powered, for ligh rage work . . . a money-saver on many jobs.

Structural-Design Text Winner of Welding Award

First award in the structural-design division of the competitive program for modernized textbooks on design, sponsored by the James F. Lincoln Arc Welding Foundation, was given to "Structural Design in Metals" by C. D. Williams and E. C. Harris. The authors are professors of civil engineering and structural engineering, respectively, at the University of Florida and Penn College.

The book has two features which make it noteworthy. The first is that emphasis is placed on the design of details rather than on the complete structure. This is desirable since so much time would have to be spent in one course on the design of a single structure that little else could be learned; furthermore, detail design, if properly learned, is as applicable to one type of structure as another. The second feature is that there is a greater coverage of welded design than is found in most texts. Both welded and riveted details in each phase of work are analyzed since both processes of construction are now of nearly equal importance.

"Structural Design in Metals" is published by The Ronald Press Co., 15 E. 26th St., New York 10, N.Y. The price is $6.50.

Black-Top Mixing Plant

An illustrated catalog, Bulletin No. 725, describes the unit-built crane-erected black-top mixing plant manufactured by the Standard Steel Corp., 5007 Boyle Ave., Los Angeles 11, Calif. Standard Steel asphalt plants are built in a range of seven sizes, 500 to 7,000 pounds mixer capacity, yielding 20 to 260 tons per hour based on a 45-second mixing cycle. They are designed for operation either by individual motors or from a single power source.

The folder points out all of the features of the component parts of the plant. Photographs of the units accompany text descriptions, and the center fold of the catalog presents a large photo of an assembled plant.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 53.

District Mgr. for U. S. Rubber

Matthew J. Delehaunty has been named District Sales Manager for the Pittsburgh, Pa., branch of the Mechanical Goods Division, United States Rubber Co. In his new capacity, Mr. Delehaunty will direct all Pittsburgh branch sales of hose, conveyor belts, packing, and other industrial rubber products. He succeeds J. W. Greenwalt who has retired from the company.

st equipment

You can depend on AC's to handle toughest snow removal at lowest cost— all through the winter

FOR LOADING OR PLOWING SNOW . . .
. . . it's the Allis-Chalmers HD-5 2-Cycle Diesel Tractor with a Tracto-Shovel light materials bucket or V-plow—both are interchangeable. Ideal for cleaning up streets, alleys, gasoline stations, parking lots . . . working around buildings, industrial plants, cemeteries, many other places. This same outfit, with other interchangeable attachments—dirt and rock buckets, bulldozer blades—handles all types of excavating and leveling . . . earns an income for contractors the year around . . . stretches city and highway budgets.

FOR CLEARING WALKS, DRIVEWAYS, PARKING AREAS . . .
. . . it's the Allis-Chalmers Model IB Industrial Wheel Tractor with broom or snow plow—"V" or blade type. Has mounting frame for quickly attaching or removing auxiliary equipment. Compact, fast, low center of gravity, short-turning radius, gasoline powered. Handles all kinds of jobs all year, at big savings.

ALL-AROUND PLOW
You can plow the toughest as well as the lightest drifts with this 17,000 lb., Allis-Chalmers HD-5 Tractor and V-plow attachment for the Tracto-Shovel. Has hydraulic tilt to break through any going. Crawlers work where rubber-tired equipment can't penetrate.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Portable Crusher Improves Highway

New Betterment Project Requires 80,000 Tons of Crushed Lava Rock Laid In Two 4-Inch Layers

✦ IT is usually the ordinary, small, unspectacular jobs done by the score each year which make America's highway system second to none.

Typical of these small but important jobs is a 7-mile section of U. S. 95 in Idaho. Here the highway has been brought up to newer standards by crushing and laying about 80,000 tons of lava rock. The work was done under a $150,000 contract with the Idaho Bureau of Highways.

Highway 95 is the main north-south route between northern and southern Idaho. It carries passenger cars, logging trucks, and many a load of agricultural produce from Idaho's rich farmlands. Over the years, the section recently reconstructed had deteriorated and the oil mat had become rough and pocked. The job restored the road and brought it up to modern 24-foot standards of width.

Included were the production and installation of 80,000 tons of ¾-inch-minus crushed flexible base, and the preparation of a 1½-inch road-mixed mat of asphalt and rock. The crushed rock was designed to correct past deficiencies in the base strength of the highway section, and should now hold ordinary truck loads without surface failure.

Portable Crusher Used

To produce the crushed rock, a portable crusher with various refinements designed to boost production was set up. The plant was composed of several standard makes of equipment, all assembled on frames and mounted on rubber tires. Everything was portable, and the plant could be disassembled in a day's time if necesary. Moves were made in three days, and the crusher was again set up to produce as high as 1,060 tons of ¾-inch-minus in a 9-hour run.

The principal feature of the plant was the use of individual electric motors on conveyor runs, shaker screens, and the feeder. An independent Buda diesel electric generating set, with an output of 100 kw, was a part of the plant. It furnished power for these dustproof motors, and the lights for night work.

About 75 per cent of the work was done with this set-up; the remaining part was sublet. To produce his part, the Subcontractor used a standard Cedarapids portable Pitmaster. The

(*Continued on next page*)

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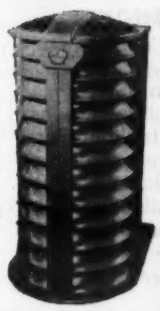

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subcontract was let in order to get the crushing work done before the autumn rains set in.

Pit Drilled and Shot

The pit site for the job was located about 2 miles from Highway 95 on a bituminous-surfaced secondary road. Rock in the pit was a relatively solid formation of hard lava, which, curiously enough, was harder on the crusher and screens than it was on the drills.

The first holes were drilled on 15-foot staggered centers, but the first shot produced quite a few rock fragments too large to pass through the jaw crusher. Holes were therefore closed up to 12-foot staggered centers and springing was increased; this helped to correct the difficulty.

A Chicago Pneumatic 350-cubic-foot air compressor furnished power to two Gardner-Denver pneumatic hand drills. Timken steel in maximum lengths of 18 feet was used, with Timken detachable rock bits. The rock was not extraordinarily abrasive, and the bits usually drilled about 10 feet before they lost gage and dulled. Excellent footage was shown, one driller making 12 holes 18 feet deep in a 10-hour shift. The drill crew of only two men stayed ahead without difficulty.

The drill holes were then enlarged at the bottom by springing three times, using Du Pont Gelex No. 2. On the third springing, 90 sticks of Gelex were used to produce a large pocket for the main charge of powder.

Each hole was then filled to within about 3 feet of the top of the ground. Du Pont Free Running No. 4 granular blasting powder was used. Each hole took ten 12½-pound bags. In order to make certain of the amount of powder, the loader saved the empty sacks at each hole, weighing the pile down with a loose rock. The amount of powder was carefully gaged to produce thorough fragmentation.

Twenty or thirty such holes were then fitted with sticks of Gelex No. 2 and No. 6 Du Pont electric blasting caps, and fired with an electric blasting machine. The finished result was a good pile of broken rock, with here and there an oversize fragment which would later have to be pushed aside or wasted. No secondary shooting was done.

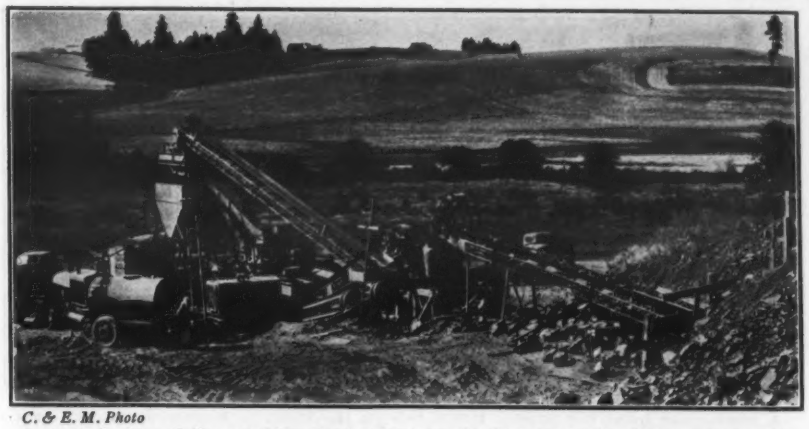
Rock Passes Through Plant

In its route through the rock-crushing plant, the material was first handled by a Caterpillar D8 tractor and bulldozer blade. This machine pushed the rock to a primary hopper made of plate steel, under which a Diamond reciprocating feeder was located. The feeder was electrically operated. It fed the raw material onto a 40-foot x 24-inch conveyor, which carried the rock up and dumped it to the jaw crusher.

This unit consisted of a Universal 24 x 35 jaw crusher, powered by a Caterpillar D13000 diesel engine through a flat-belt drive. Crusher jaws for this job were set at a clearance of about 3½ inches, to reduce the rock size suitable for the other machines in the plant.

From the jaw crusher, a 24-inch conveyor carried the rock up an incline to a double 4 x 10-foot deck of Telsmith vibrating screens, powered by an electric motor. The top deck of this screen was equipped with 1¼-inch wire mesh, and the bottom deck was equipped with ¾-inch mesh screen for this job. This was necessary to produce ¾-inch-minus material, and to insure from 45 to 65 per cent which would pass the No. 4 screen used in testing.

Small rock which dropped through both decks of the vibrating screen passed directly to a 15-ton metal storage hopper placed over a set of platform truck scales. Large rock fragments rejected on the top deck passed by chute to a 3-foot Symons cone crusher powered by a Caterpillar D13000 diesel engine. Fragments passing the top deck but rejected on the second deck passed by chute to a set of 24-inch Symons rolls. Material from the cone and roll crushers was again routed to the conveyor belt leading up to the vibrating screens.



C. & E. M. Photo

A general view of the crushing-plant layout on the U. S. 95 job in Idaho. Every unit in the plant was assembled on a frame and mounted on rubber tires for portability.

The clearance of the roll and cone crushers was adjusted occasionally to produce the proper gradation of material. State inspectors on the job ran screen analyses each day to check performance. The surface of the roll crushers was built up to be abrasion-resistant with Hascrome hard-surfacing welding rod.

Laying the Crushed Rock

Five International and two Studebaker dump trucks, each hauling 7-ton loads, were used to take crushed rock from the transfer hopper and haul it on the road. By using a set of platform scales under the hopper, constant weights could be put in each load. This made it rather easy to lay the rock down uniformly in 4-inch layers as required by the specifications. Ordinarily one of the truck loads covered 50 feet. A dumpman controlled the dumping, using a distance chain to check the length of dump for each load.

When a section about 1,000 feet long had been dumped, it was ready to road-

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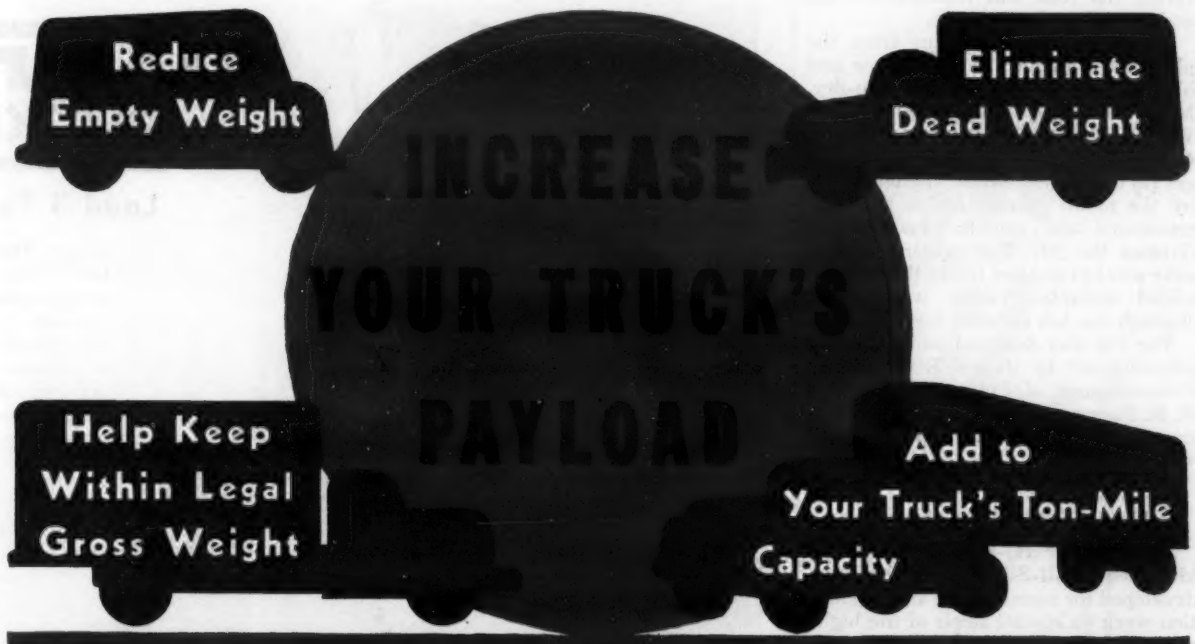

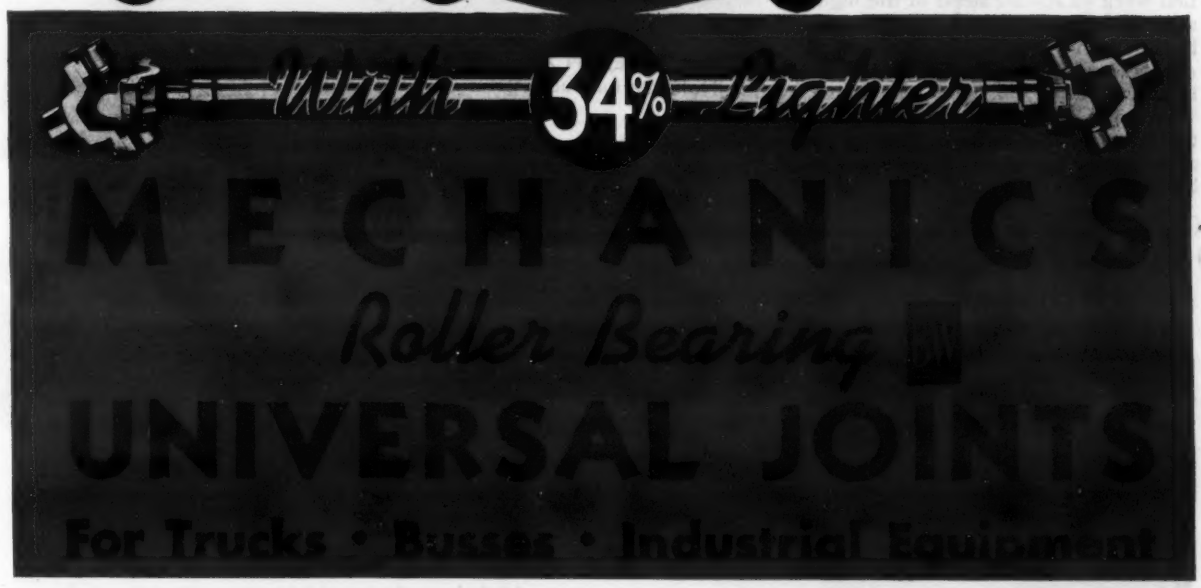

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A Portable Crusher Improves Highway

(Continued from preceding page)

mix with water and a Caterpillar No. 12 motor grader. The water tank truck consisted of an International truck on which was mounted a 2,000-gallon water tank. A Waukesha engine with a Rex 4-inch centrifugal pump and a flexible hose intake permitted the truck to be loaded at a creek in about 3½ minutes. A gravity plate-type distributor fed the water to the crushed rock when a valve was opened.

The crushed material was road-mixed with water until it was uniformly distributed. This practice also helped to redistribute any segregated particles of coarse ¾-inch rock through the windrow. The material was then laid down by the blade, and rolled by a 10-ton Buffalo-Springfield steel-wheel roller. A second 4-inch lift completed the flexible-base work.

The crushed-rock section was left open to traffic through the winter. This spring the rock was reshaped, rolled, and topped with road-mix.

The road-mix aggregates from the plant were dumped in a windrow and bladed until they were surface-dry. MC-2 asphalt was then applied by a Wood Roadmixer at the rate of about 4 per cent. The material was aerated to get rid of volatile matter, and laid down by the motor grader, and a thorough pneumatic and smooth-wheel rolling finished the job. The existing asphalt cake was left in place under the rock for added stability. Traffic was routed through the job as work went on.

The job was designed and generally administered by James Reid, Idaho's Commissioner of Public Works, with R. M. Parsons of Coeur d'Alene as District Engineer in local charge of the work.

C. & E. M. Photo
A powderman loads bag powder into a hole on the Idaho rock-crushing project, as a compressor and pneumatic drill work in the background.

Versatile Electrode

A new general-purpose electrode identified as All-State No. 252 has been developed for maintenance and production work on special steels of the high-alloy and high-carbon types. It is now being offered by All-State Welding Alloys Co., Inc., 273 Ferris Ave., White Plains, N. Y.

The firm states that the electrode's tensile strength of 85,000 to 95,000 psi is accompanied by excellent resistance to heat, corrosion, and wear. It is said to give superior performance in welding low-alloy steels without pre-heat and subsequent heat treatment, and in joining dissimilar steels, as well as building up case-hardened parts and welding clad steels.

All-State No. 252 is an ac-dc electrode. It is said to have a yield strength of 50,000 to 60,000 psi, an elongation of 35 to 45 per cent, a reduction of area of 35 to 50 per cent, and impact at room temperature (Charpy Keyhole) of 150 to 175.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 137.

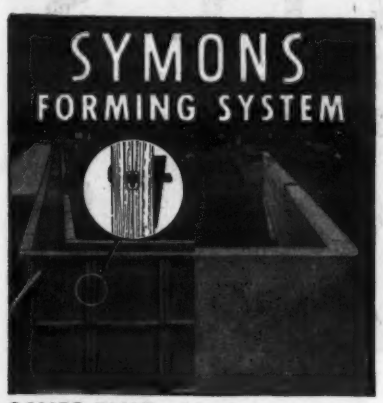
Winter Snow Fighting

Catalog insert sheets on Walter Snow Fighters are now available from the Walter Motor Truck Co., 1001-19 Irving Ave., Ridgewood, Queens, Long Island, N.Y. These units are made in 125, 185, 240, and 250-hp models, all with a 6-cylinder engine. They feature the Walter four-point positive drive with correct automatic differential and driving action between all four wheels to give maximum traction.

The attractive two-color sheets contain complete descriptions of these snow-plow trucks. Details, specifications, and features are listed below photographs of the models. Also included are specifications and descriptions of center scrapers, center blades, wings, and one-way plows.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 157.

SYMONS
FORMING SYSTEM



SAVES TIME
Inset shows how Symons System saves time in erecting and stripping forms. Bolt passes through 2 x 4 studs and tie loop. Wedge secures the assembly. This simple device cuts forming time 50%.

SAVES LABOR
Harry G. Dehring, Foreman, Taylor Brothers, South Bend, Ind., states "Seven men set up the forms for a 26' x 27' foundation in one hour and fifteen minutes."

SAVES COST
With Time and Labor cut in two . . . Plus savings in nails, spreaders, waters and bracing . . . Plus far greater reuse of forms . . . Costs drop to a new low.

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HAISS LOADER IN ACTION
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HAISS LOADER and Conveyors Combination

HAISS •BUCKET LOADERS

Load 3 To 8 Yards Per Minute

Haiss Bucket Loaders are used for excavating — rehandling — stripping and loading: sand — gravel — stone top-soil — coal and similar materials. Self Propelled, Self Feeding — wheel or crawler mounted — One man operation. Write for Bucket Loader Catalog today.

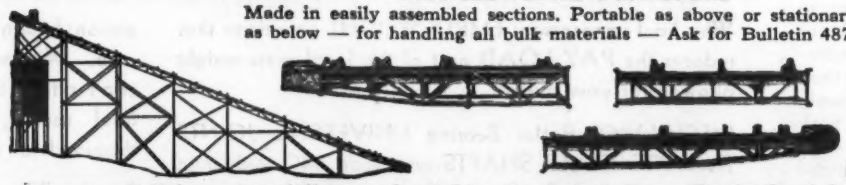
•CONVEYORS portable or stationary

HAISS FLAT or TROUGH BELT CONVEYORS
(Model 481 and 482)
For all bulk materials. Mounted on "V" or mast truck with swivel wheels. Ask for Bulletin No. 481 for coal or coke handling—Bulletin No. 482 for sand and gravel, etc.

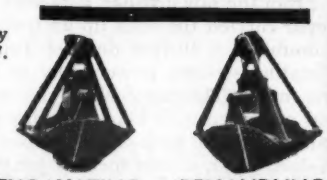
CAR UNLOADERS

HAISS CAR UNLOADERS
(Models 483 and 484)
Belt and drag types for low-cost undercar unloading from hopper bottom cars. Ask for bulletin No. 483-4.

HAISS SECTIONAL CONVEYORS
Made in easily assembled sections. Portable as above or stationary as below — for handling all bulk materials — Ask for Bulletin 487.



•BUCKETS



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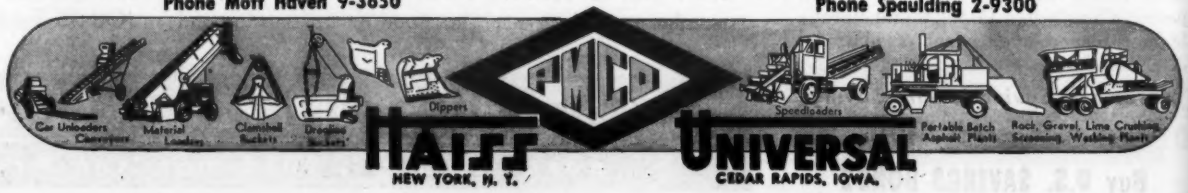


HAISS NEW YORK, N. Y.
PMCP
UNIVERSAL CEDAR RAPIDS, IOWA.

Half-Yard Excavator, Hydraulic Controls

A new shovel-crane equipped with Speed-O-Matic full hydraulic controls is the Model LS-51, manufactured by Link-Belt Speeder Corp., 307 N. Michigan Ave., Chicago 1, Ill. This ½-yard excavator is fully convertible for operation as a shovel, trench hoe, lifting crane, dragline, clamshell, or pile driver.

The front drum lagging used in dragline and other cable operations is interchangeable with a split sprocket used in connection with the independent positive chain crowd on shovel operations. The independent boom hoist provides hoisting and lowering of the boom under power of the engine. Power lowering assures safety.

Designed for balanced rotation, the LS-51 has hook-type conical rotating rollers, individually mounted, bronze-bushed, and adjustable. Maintenance is simplified by interchangeability of such parts as front and rear drum clutches, the boom-hoist clutch, and the swing and travel clutches.

Further information on this new shovel crane may be secured from the company. Or use the Request Card at page 16. Circle No. 108.

AASHO Method of Lighting Snow and Ice-Control Units

The American Association of State Highway Officials has recently adopted a Standard Uniform Method of Lighting Snow Removal Equipment, in order to facilitate recognition of such equipment on the highways and to avoid accidents by motor-vehicle users. The method is as follows:

1. Identification lights should be provided on all snow and ice-control equipment. These lights should be: located on the cab, visible from all directions, blue in color, a minimum of 6 inches in diameter and flashing with a minimum light intensity of from 21 to 32 candlepower.

2. Clearance lights should be provided on snow and ice-control equipment. One light should be mounted on the left side of the cab, adjustable to the extreme width of the plowing equipment. A clearance light should also be placed on the right side of the cab when plowing wings are not used. These clearance lights are to be at least 2 inches in diameter, with ordinary taillight intensity, and to appear amber from the front and red from the rear. When wings are used, floodlights should be provided to illuminate the plowing wing.

3. Truck headlights are to be raised above normal lights so as to clear operating equipment. Auxiliary headlights are to be used if necessary. Additional operating lights may be located on top of the cab or at other places to illuminate plowing, abrasive spreading, or other equipment.

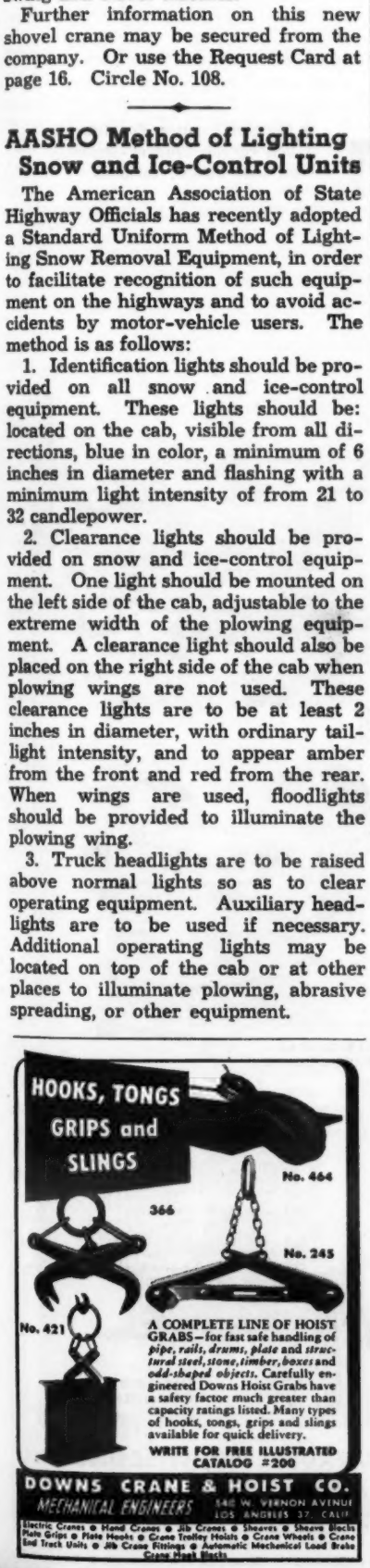
Here is the Link-Belt Speeder LS-51 ½-yard shovel-crane operating as a shovel. The insert shows the operator's side of the control stand and illustrates the arrangement of the Speed-O-Matic hydraulic controls.

Slide Rule, 6-Inch Log Log, 16 Scales

A new 6-inch all-metal log log duplex slide rule, bearing the regular 10-inch log log scale arrangement, is announced by Pickett & Eckel, Inc., 5 S. Wabash, Chicago 3, Ill. The Model 300 rule is 1-3/32 x 3/32 x 6 inches in size. It comes in a leather pocket case, slip-boxed with an instruction manual.

The rule incorporates the following features: a 16-scale arrangement with LL1, A-B, T, S, C-D, and LL2 on the front, and LL3, DF-CF, CIF, CI, C-D, and L on the back; a magnesium-alloy body, with optical tongues and grooves machined to 0.001-inch accuracy, to insure alignment, freedom from distortion, and easy operation; a combination of C-D scales on both sides of the rule, together with folded and reversed scales, to speed figuring and avoid going "off-scale".

Further information may be secured from the manufacturer. Or use the Request Card at page 16. Circle No. 154.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A COMPLETE LINE OF HOIST GRABS—for fast safe handling of pipe, rails, drums, plate and structural steel, stone, timber, boxes and odd-shaped objects. Carefully engineered Downs Hoist Grabs have a safety factor much greater than capacity ratings listed. Many types of hooks, tongs, grips and slings available for quick delivery.
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Electric Cranes • Hand Cranes • Jib Cranes • Sheaves • Sheave Blocks
Plate Grips • Plate Hooks • Crane Trolley Hoists • Crane Wheels • Crane End Truck Units • Jib Crane Fittings • Automatic Mechanical Load Brake Crane Hook Blocks

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Equip your transmissions with inexpensive Fuller Transmission Oil Filters—easily installed on all Fuller Transmissions and most other makes. The new Fuller Filter keeps gear box oil clean between changes. Normal pressure of rotating gears forces the oil through a cleansing filter element and returns it to the gear box. Clean oil saves wear and tear on moving parts—saves you money on parts, labor and down-time. Write for more information.
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Distributor Doings

R. G. Moeller's 25th Anniversary

Twenty-five years ago R. G. Moeller started a construction and industrial equipment business which has since become outstanding in Michigan. Some of the firm's growth in the early days was probably due to Moeller's initiating rental services for all types of construction equipment, a practice that is now widely accepted.

The Detroit office was enlarged and done over recently. The shop and parts departments were given more space. There are now 17 mechanics and 3 parts-department employees under the supervision of Charles Melvin. Bob Moeller has built up a staff of able coworkers. They include O. H. Baker, Vice President; C. E. Fader, Manager of the Kalamazoo branch office; Charles Garretson, Secretary and Purchasing Agent; and John Drake, head of the Accounting Department.

Equipment Co. Has Teletype Service

J. E. Ingram Equipment Co., San Antonio construction machinery and supply dealer, has instituted a teletype service, for the convenience of its customers, between its locations at San Antonio, Corpus Christi, and Edinburg, Texas.

It was found that by installing this service, the company was able to give much quicker delivery, particularly on small items that would not justify a telephone call between branches. With the service, it is now able to offer delivery from three stocks with the same promptness as from one large stock.

The main advantage of teletype is that the wire is leased from 9 a. m. to 5 p.m. and not on a per word basis, and the company feels free to call any number of times daily for the slightest reason.

Also, written messages eliminate the costly mistakes that otherwise could be made by telephone messages.

New Marion Dealers

The Brown-Bevis Equipment Co., 4900 Santa Fe Ave., Los Angeles, Calif., was recently appointed Marion Power Shovel Co. distributor for southern California and parts of Nevada.

The M & F Equipment Co., 2521 Isleta Highway, Albuquerque, N. Mex., has been appointed Marion Power Shovel Co. distributor for all of New Mexico lying north of and including Catron, Socorro, Lincoln, Chaves, and Roosevelt Counties.

O. G. Stapley Dies of Heart Attack

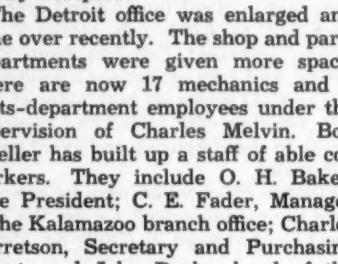
O. Glenn Stapley, President of the O. S. Stapley Co., Phoenix, Ariz., died recently at 54 years of age in a Salt Lake City hospital. Mr. Stapley was stricken with a heart attack on his way home to Phoenix, from Portland, Oreg. He was the eldest son of the founder of the O. S. Stapley hardware and machinery stores.

Acrow Dealers in South, Midwest

Acrow, Inc., New York City manufacturer of adjustable steel shores, column clamps, trench jacks, etc., has appointed four distributors. Southern States Equipment Co., 425 Celeste St., New Orleans 11, La., will represent Acrow in Louisiana. J. E. Ingram Equipment Co., 1146 W. Laurel St., San Antonio, Texas, will cover 13 counties in southern Texas. Cochran

(*Continued on next page*)

Officials of the John Fabick Tractor Co., Lorain distributor in St. Louis, Mo., receive one of The Thew Shovel Co.'s 50th anniversary cakes from a Western Union messenger. John Fabick holds the cake, while Francis Fabick and Thew District Manager F. A. Williamson read the message that came with it.



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Gasoline Engine or
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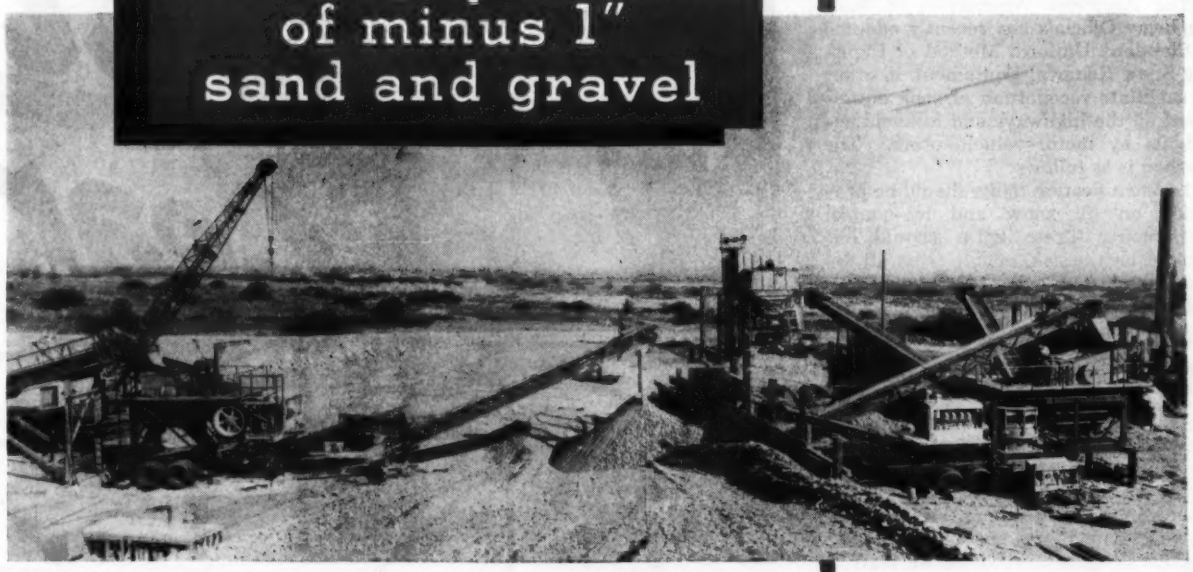
CONCRETE GRINDERS

OTHER PRODUCTS
FRONT END SHOVELS
for Industrial Tractors
HEATING KETTLES
for Asphalt and Tar
AGGREGATE DRYERS
for Stone and Sand
ASPHALT PLANTS
Portable — Stationary
Write for Circulars

White Mfg. Co.
ELKHART INDIANA

Enormous Capacity
of minus 1"
sand and gravel

● Morrison Knudsen Co. Telsmith 2-Unit Portable Crushing-Screening Plant near Ontario, California.



TELSMITH

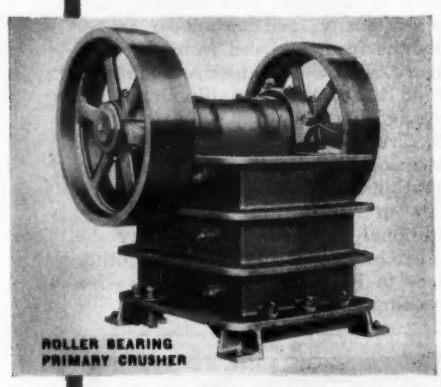
2-UNIT PORTABLE PLANT
***with* Gyrasphere Secondary Crusher**

● The MORRISON KNUDSEN CO. of Boise, Idaho, and California are producing about 275-300 tons per hour of minus 1-inch sand and gravel, for road building, with their Telsmith 2-Unit Portable Crushing-Screening Plant. Plant consists of . . .

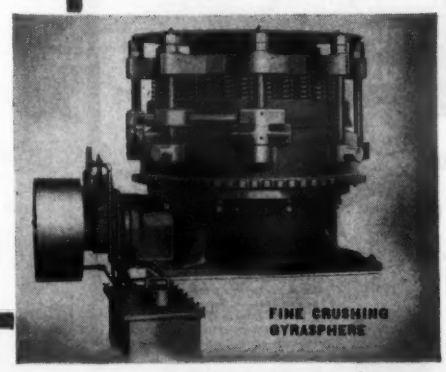
PRIMARY UNIT	SECONDARY UNIT
30" x 5'6" Plate Feeder	5' x 12' Triple Deck Sizing Screen
4' x 8' Double Deck Scalper	48" Gyrasphere Crusher
18" x 32" Roller Bearing Jaw Crusher	30" x 40' Plant Conveyor
30" x 25' Plant Conveyor	125 hp. Diesel Power Unit
105 hp. Diesel Power Unit	Five Feed and Stock-piling Conveyors

Primary Unit is taking pit run sand and gravel with 15" to 18" boulders, with the jaw crusher set at about 3". Material is then stock-piled, and fed to Secondary Unit, with Gyrasphere taking about 4" feed. Finished product goes to cement, and asphalt mixing plants. Here again, the Telsmith 2-Unit Portable Plant with Gyrasphere Crusher is giving remarkable capacities.

P-14



ROLLER BEARING PRIMARY CRUSHER



FINE CRUSHING GYRASPHERE

Consult TELSMITH Engineers . . . Get Bulletin P-34

SMITH ENGINEERING WORKS, 4014 N. HOLTON STREET, MILWAUKEE 12, WISCONSIN

Cable Address: Sengworks, Milwaukee

51 East 42nd St. New York 17, N. Y. · 211 W. Wacker Drive Chicago 6, Ill. · 713 Commercial Trust Bldg. Philadelphia 2, Pa. · 238 Main Street Cambridge 42, Mass. · Boehck Eqpt. Co. Milwaukee 3, Wis. · Brandeis Mach. & Supply Co., Inc. Louisville 8, Ky.

Clyde Equipment Co., Portland 9, Ore., & Seattle 4, Wash. • General Machinery Co., Spokane 1, Wash. • Interstate Equipment Co., Statesville, N. C. • Rish Equipment Co., Charleston 22, & Clarksburg, W. Va.—Roanoke 7, & Richmond 10, Va. • Wilson-Weesner-Wilkinson Co., Knoxville 8, & Nashville 6, Tenn.

Distributor Doings

(*Continued from preceding page*)

Equipment Co., 200 Portwood St., Houston, Texas, has been named to handle 34 counties in the southeastern part of Texas. The Minneapolis Equipment Co., 520 S. E. Second St., Minneapolis, Minn., has been appointed distributor for the state of Minnesota and 22 counties in the state of Wisconsin.

Ziegler Sales Personnel Changes

The Wm. H. Ziegler Co., Inc., Minneapolis, Minn., has announced three changes in its sales personnel. Dave Gulliford, former floor salesman for the Road Machinery Division, is now handling special assignments in the Twin Cities area. Wm. J. Benjamin, who used to cover a territory in south-central Minnesota, has been transferred to the Minneapolis office as a floor salesman. He will assume the duties held by the late Roy Smith. Fred Bonnifield will replace Mr. Benjamin in the field.

Washburn, Bemiss Branch Manager

The Bemiss Equipment Corp., Richmond, Va., has announced the appointment of George M. Washburn, Jr., as Office Manager of the Roanoke Branch. Joseph A. Stone, Branch Manager for the past 5 years, resigned to enter the contracting firm of Stone & Weber.

Stud-Welding Dealer in Western U.S.

Industrial Supply Co., Inc., Salt Lake City, Utah, has been appointed a distributor for Nelson stud-welding equipment in the states of Utah and Montana, and in portions of Idaho, Wyoming, and Nevada. The company will also serve as exclusive rental agent for the Nelson stud-welding gun.

Cedarapids Dealer for Arkansas

The Lyons Machinery Co., 904 Broadway, Little Rock, Ark., has been appointed distributor in Arkansas by the Iowa Mfg. Co., manufacturer of the Cedarapids line of crushing, screening, aggregate-handling, and asphalt plants.

New Dealer Quarters in Phoenix

Roy Robinson, President of the State Tractor & Equipment Co., Phoenix, Ariz., has announced that the firm is now settled in new quarters at 407 S. 17th Ave. Representing an investment of over $150,000, the quarters provide display rooms and stock spaces in the main building; in a south wing two stories high are offices, and sales and testing rooms. The sales office includes a 200-seat theatre in which prospective buyers are shown motion pictures of equipment in operation.

LeTourneau in Two Southern States

New distributors to serve earth-moving contractors in two southern states have been signed by the LeTourneau Co.—for North Carolina, Mitchell Distributing Co., 733 W. Hargett St., Raleigh, N. C., and Spruce Pine, N. C.; for northern Louisiana, E. C. Ray Machinery Co., 2001 E. Texas St., Bossier Branch, Shreveport, La.

Diesel Equipment Co. of Wichita Is Appointed Distributor for GMC

The Diesel Equipment Co. of Wichita, Kans., has been appointed exclusive distributor for General Motors Series 71 diesel engines in central and western Kansas. The franchise covers industrial and petroleum engine sales as well as service in those counties west of and including Washington, Clay, Dickinson, Morris, Chose, Greenwood, Elk, and Chautauqua.

The company was organized last winter for the express purpose of marketing GM diesel engines. James D. Jarvis is President. Andrew C. Cartwright directs engine sales. Complete sales, service, and parts operations are quartered in a modern 130 x 150-foot building on Highway 81, a mile north of the center of town. Among the special facilities offered are two service trucks for field inspection and repair work.

Scranton Machine Works of Great Bend and Ben Hasz of Scott City, Kans., operate as franchised dealers under the new Wichita distributor.

Diesel Equipment Co. of Wichita, Kans., has been appointed exclusive distributor for General Motors Series 71 diesel engines in central and western Kansas.

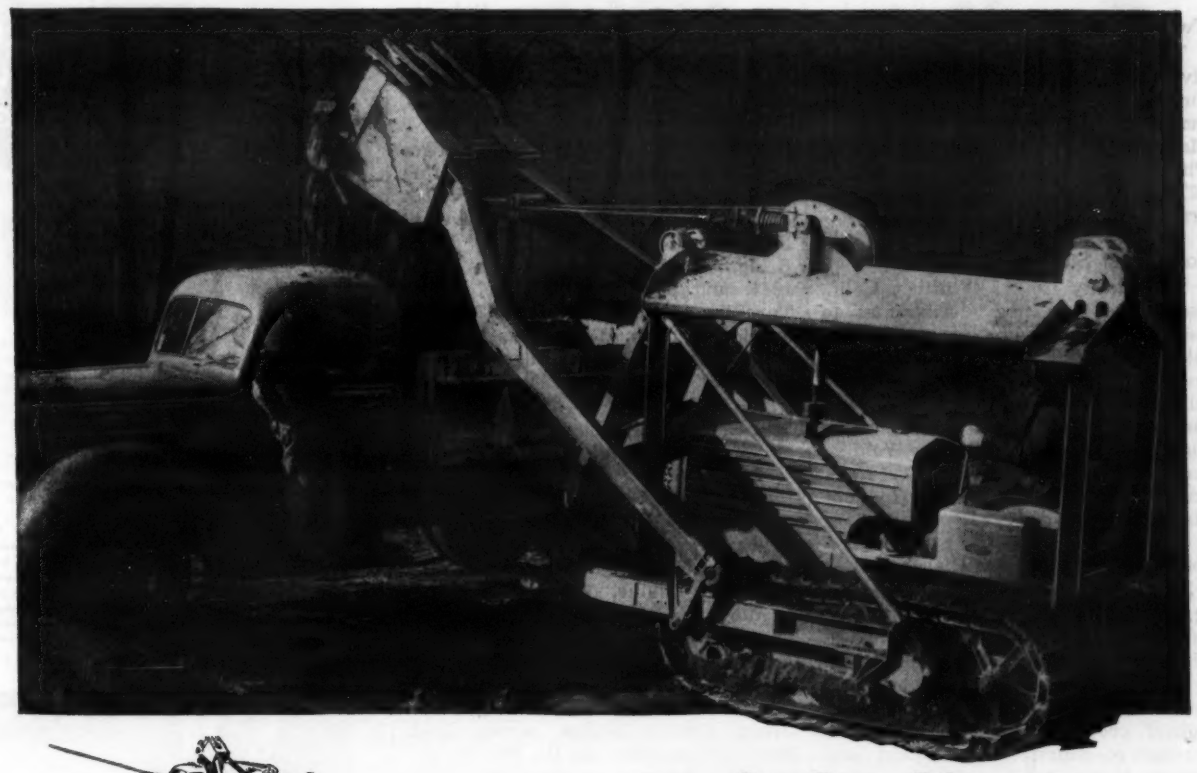
Birmingham Dealer Sales Changes

The Tractor & Equipment Co. of Birmingham, Ala., has announced the following changes in its sales and service personnel. J. M. Flautt has been transferred to the Birmingham area to serve the territory formerly covered by A. L. McFarland, who has resigned. J. M. Waitzman has been transferred to Flautt's former territory, which consists of Bibb, Cullman, Fayette, Franklin, Lamar, Marion, Pickens, Shelby, Tuscaloosa, Walker, and Winston Counties. W. G. Hazelrig replaces Waitzman in office sales.

Dakota T&E Co. Has New Buildings

New buildings of the Dakota Tractor & Equipment Co. were opened recently in Bismarck, N. Dak. The two buildings are located on Highway 10 at the east end of town. The main building, 102 x 138 feet, houses the dis-

(*Concluded on next page*)



...a straight line

is the economical distance between two points!

The straight-line operation of an Oliver "Cletrac" tractor and Sargent Overhead Shovel will cut your costs . . . *plenty!* Here's why!

This unit crowds *directly* back in digging or loading . . . moves *directly* forward to load out trucks. The shovel arms swing *directly* over the tractor. Contrast this fast action to ordinary loaders where the tractor must crowd into the pile . . . back out . . . turn around and travel to truck or dumping pile. Easy to see why jobs move so much faster . . . why you can really cut costs!

And, the Basic Overhead unit can be quickly and economically converted to a Backhoe, Bulldozer, Pipe Handler, or Log Loader . . . a complete crew at a fraction of the cost of combined individual units.

Your Oliver "Cletrac" Distributor will be glad to give the complete, cost-cutting story.

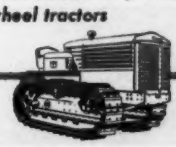
Cletrac

a product of

THE OLIVER CORPORATION

Industrial Division: 19300 Euclid Avenue, Cleveland 17, Ohio

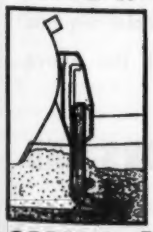
A complete line of crawler and industrial wheel tractors



OLIVER

"THE SIGN OF EXTRA SERVICE"

BACK-RIP SCARIFIER



RIPS in your dead-head time when backing for new load.

BACK-RIPPING Saves Contractors TIME, MONEY and EQUIPMENT.

Hinged teeth assemblies mount on back of Bulldozer moldboards.

SWINGS FREE WHEN DOZING

SMALL EQUIPMENT COMPANY

816 North La Cienega Blvd.
LOS ANGELES 46, CALIFORNIA

Distributor Doings

(*Continued from preceding page*)

play floor, offices, and shop. The smaller building, 60 x 40 feet, contains the track press, washing stall, and paint booth. Earl Armstrong, Vice President, is the Bismarck Branch Manager.

Dealer Demonstration in Greensboro

The E. F. Craven Co. of Greensboro, N. C., had a well attended showing at its recent demonstration of Allis-Chalmers tractors and motor graders on White Street in northeast Greensboro. The tractors and graders were put through their paces right on the job for the benefit of visitors during the two-day demonstration. An A-C motor grader was used on a bed of almost solid rock, and an HD-5 tractor with a Tracto-Shovel pushed over trees and dug stumps in addition to loading dirt and grading.

Two Appointments by Hydro-Line

The following have been made exclusive representatives for Hydro-Line air and hydraulic cylinders and special machinery: Hydraulic Service Co., 7550 Mayland St., Philadelphia, Pa., for the Philadelphia area; and Alton J. Fabrey, 227 Fourth St., Scotia, N. Y., for western New York State.

East-Coast Stoody Distributors

The Stoody Co. of Whittier, Calif., has added two new distributors to handle its entire line of hard-facing alloys. Morris, Wheeler & Co., Fox St. and Roberts Ave., Philadelphia, Pa., will cover New Jersey, Delaware, Maryland, and eastern Pennsylvania. The area served by Silver Welding Supply Co., 1758 Centre St., West Roxbury, Mass., is the eastern half of Massachusetts.

Hobart Appoints New Distributor

J. E. White, 1802-08 S. Seventh St., St. Louis, Mo., has been made distributor for Hobart Brothers Co., Troy, Ohio, and will operate under the name of Hobart Welder Sales & Service. This firm will supply the complete line of Hobart arc-welding equipment to a number of counties in Missouri and western Illinois.

AISC Bridge Awards For the Years 1942-47

The Julien Dubuque Bridge, which spans the Mississippi River and connects Dubuque, Iowa, with East Dubuque, Ill., was recently awarded a stainless-steel plaque by the American Institute of Steel Construction. The bridge was chosen by a jury of architects and engineers as the most beautiful bridge in the United States for the year 1943, in the class comprising fixed bridges with spans of over 400 feet.

This award was one of several made recently by the AISC for the most beautiful bridges opened to traffic in the years 1942 to 1947 inclusive. The Institute usually makes its awards on an annual basis, in four classes, but due to a curtailment of bridge building during the war, no annual judging had been done since 1941. Not all classes of bridges are represented in every year covered in the judging period.

Classes in which awards and honorable mentions were given were as follows: In Class I, fixed bridges with spans of 400 feet or more, the award was given to the Julien Dubuque Bridge, opened to traffic in 1943; and honorable mentions went to the Thames River Bridge, New London to Groton, Conn., 1943, and to Memorial Bridge, Clay's Ferry, Ky., 1945.

Class II awards, for fixed bridges with spans under 400 feet and costing over $500,000, included the Charter Oak Bridge across the Connecticut River at Hartford, Conn., 1942; Pecos River Bridge from Del Rio to Langtry, Texas, 1944; and Saco River Bridge, Maine Turnpike near Saco, Maine, 1947. Honorable mentions in the class included the Colorado River Bridge, Topock, Ariz., 1945, and Canyon Diablo Bridge, Ariz., 1947.

In Class III, fixed bridges with spans under 400 feet and costing less than $500,000, awards were made to the Interchange Bridge, Middle River, Md., 1942; Little Tennessee River Bridge, Graham-Swain Counties, N. C., 1945; and Old Alfred Road Underpass, Maine Turnpike, Maine, 1947. Honorable mentions included the Franham-Irving Bridge, Erie County, N. Y., 1942; Manchester-Billings Bridge, Dutchess County, N. Y., 1942; Portland Street Overpass, St. Johnsbury, Vt., 1944; Grand Detour Bridge, across Rock River at Grand Detour, Ill., 1947; Stratford, New Hampshire-Bloomfield, Vermont Bridge, across Connecticut River, 1947; and Klingle Road Bridge, Rock Creek, District of Columbia, 1947.

In Class IV, movable bridges, the President Harry S. Truman Bridge across the Missouri River at Kansas City received an award for 1945, as did the Absecon Boulevard Bridge over Beach Thoroughfare at Atlantic City, N. J., 1946. Honorable mentions in this class included the Cheesequake Creek Bridge, Sayreville, N. J., 1943, and the Commodore Schuyler F. Heim Bridge, across Cerritos Channel, Terminal Island, Los Angeles County, Calif., 1947.

JOE SAYS IT'S LIKE RIDING ON A CLOUD
SINCE WE INSTALLED VELVETOUCH ALL-METAL
CLUTCH FACINGS AND BRAKE LININGS
You'll note the difference, too . . . in smoother operation that cuts fatigue and engine wear. In more dependable starts and stops. And in extra service between teardowns. Because Velvetouch all-metal clutch facings and brake linings are heavy-duty built to give you longer wear, more uniform performance. They can't rot in oil . . . are not affected by moisture. They run cooler . . . install easier . . . and actually cost less on the basis of work done. Specify genuine Velvetouch on your next order . . . and get the operating advantages found only in all-metal construction.
25 years of service • 1924-1949
THE S. K. WELLMAN CO. WAREHOUSING CENTERS
ATLANTA . 119 14th St., N. E.
BOSTON . 171 Brighton Ave.
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CLEVELAND . 1392 E. 51st St.
DALLAS . . . 3407 Main St.
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PHILADELPHIA 97 E. Montana St.
PORTLAND 636 N. W. 16th Ave.
SAN FRANCISCO 424 Bryant St.
TORONTO, ONTARIO, CANADA
The S. K. Wellman Co., of Canada, Ltd. 2839 Dufferin St.
FOR BRAKE AND CLUTCH USE
Velvetouch
ORIGINAL EQUIPMENT . . . WITH THE LEADERS
THE S. K. WELLMAN CO • 1374 E. 51st ST., CLEVELAND 3, OHIO

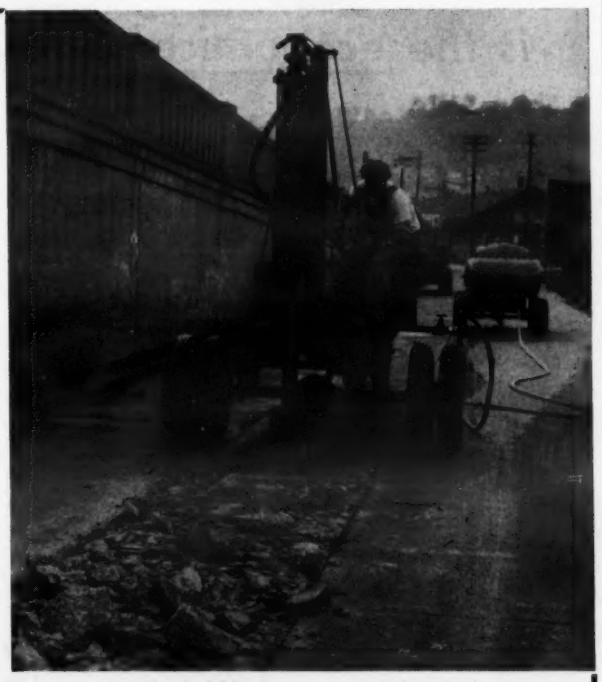
JUNIOR MODEL "M"

BREAKS 9" REINFORCED CONCRETE FOR 4½¢ PER SQUARE FOOT

Powered by a 210 CFM Compressor and operated by *one man*, the Junior Model "M" reduces the cost of breaking, saves time and makes money for the contractor.

WRITE FOR COMPLETE INFORMATION

R.P.B. CORPORATION
2751 East 11th Street · Los Angeles 23, California



Breaking 9" Reinforced Concrete* on a recent job in Cincinnati

***Cuts 5-foot width in one standing**

470 FOURTH AVENUE

New York 16, N. Y.

is information Headquarters

for contractors, highway officials and distributors wanting further details or printed matter from the manufacturers advertising in these pages. Our Reader Service Department will be glad to forward any literature or special requests you mail to us at the above address.

CONTRACTORS AND ENGINEERS MONTHLY

The Model HCV-3 Hi-lectric concrete vibrator, powered by a HGG-1 Hi-lectric gasoline-engine-driven generator.

Concrete Vibrator And Generator Unit

A Model HCV-3 Hi-lectric concrete vibrator powered by a Model HGG-1 Hi-lectric gasoline-engine-driven generator is now being manufactured by Maginniss Power Tool Co., P. O. Box 28, Mansfield, Ohio.

The one-man concrete vibrator has no flexible shaft. It contains a 180-cycle motor in the head, weighs 12 pounds, and is 2⅜ inches in diameter. The generator operates two vibrators simultaneously, or one vibrator and 1,000 watts of 110-volt floodlights, or 2,500 watts of floodlights when used as a power plant only. It weighs 300 pounds. The Hi-lectric line cable from vibrator to generator may be any length up to 200 feet.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 98.

Lightweight Mixer For Plaster, Mortar

A 6-cubic-foot lightweight mixer for plaster and mortar is made by the Anchor Mfg. Co., 2533 E. 73rd St., Chicago 49, Ill. Its flexible design allows a choice of power unit—a 1-cylinder or 2-cylinder air-cooled Wisconsin engine or a 2-cylinder liquid-cooled Le Roi engine. Any type of electric motor and starter to meet local current specifications may also be chosen. The mixer features a low 36-inch charging height and a 16-inch discharge height.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 86.

Heavy-Duty Belt Conveyor

Information on its line of belt conveyors is available from the Goodman Mfg. Co., Halsted St. at 48th, Chicago 9, Ill. The Type 99-5 conveyor is a high-speed belt for rugged service: for slopes, for example, or where a self-contained unit, not requiring anchors or outside jacks, is wanted. It is for use with motors up to and including 75 hp.

The bolted construction of this conveyor provides the approximate rigidity of a non-sectional conveyor, yet retains the features of portability and quick assembly through the use of easily handled component parts. Other belt conveyors and accessories are also manufactured by the company.

Information on these belt conveyors may be secured from the company. Or use the Request Card at page 16. Circle No. 149.

Measures Grade or Slope

Information on the automatic Slope-Meter is now available in two bulletins issued by Wm. H. Ziegler Co., Inc., 2929 University Ave. S. E., Minneapolis 14, Minn. The first presents the uses and features of the meter; the second gives operating instructions and explains how the Slope-Meter works.

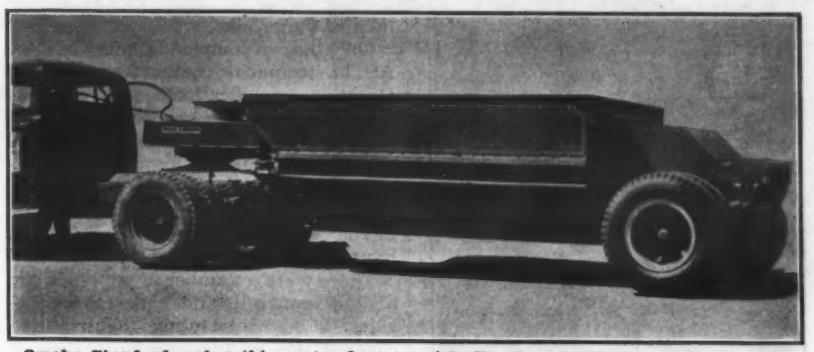
The Slope-Meter can be attached to any grader, scraper, bulldozer, or tractor to indicate the slope of the ground surface over which the unit is traveling. It may be located in any convenient transverse position on the unit or longitudinally positioned for bulldozers doing sidehill work.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 107.

Bottom-Dump Trailer

Omaha Standard, Council Bluffs, Iowa, has announced a new custom-designed center-dump semi-trailer for gravel, dirt, and rock. Its low center of gravity is designed to permit dumping operations on terrain that would prohibit the use of hydraulic end-dumps.

A metered control permits door openings from 4 to 16 inches by hand adjustment. This control can be pre-set at any time, with the trailer either loaded or unloaded. The company points out that it is not necessary to regulate flow of materials by high or low speed of the motor truck during dumping operations.

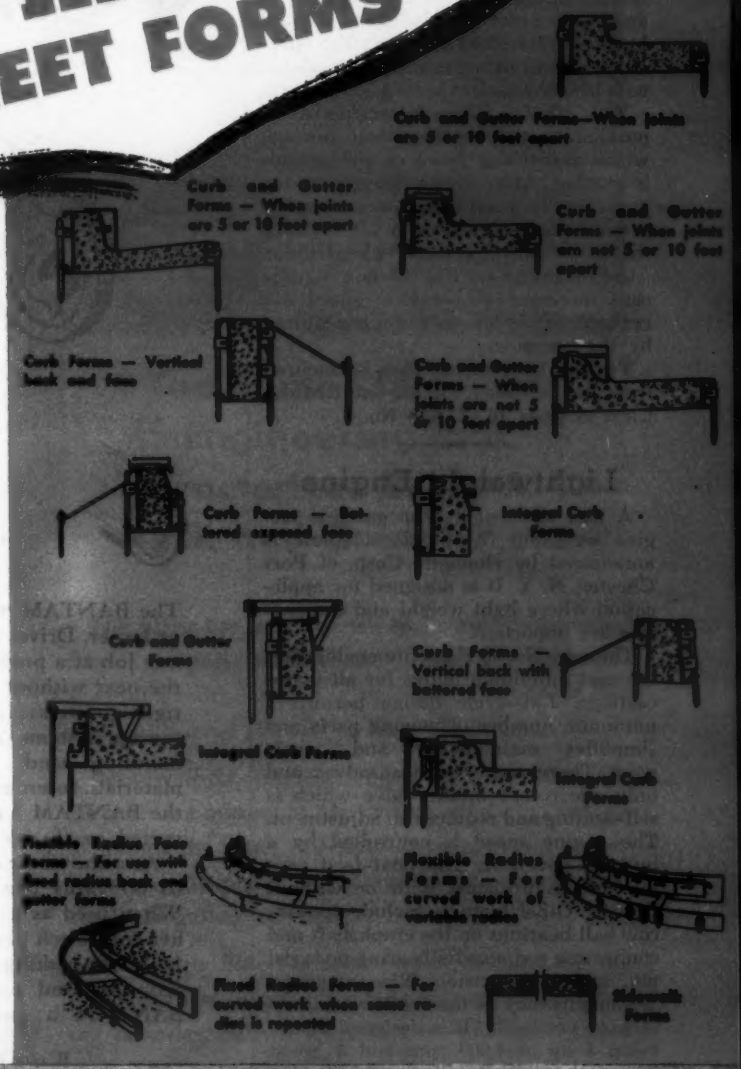


Omaha Standard makes this center-dump semi-trailer for gravel, dirt, and rock. The all-steel body is designed as an integral part of the trailer chassis.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 128.

Look at the variety of work you can do with a set of

BLAW-KNOX STEEL STREET FORMS


Curb and Gutter Forms—When joints are 5 or 10 feet apart
Curb and Gutter Forms — When joints are 5 or 10 feet apart
Curb and Gutter Forms — When joints are not 5 or 10 feet apart
Curb Forms — Vertical back and face
Curb and Gutter Forms — When joints are not 5 or 10 feet apart
Curb Forms — Battered exposed face
Integral Curb Forms
Curb and Gutter Forms
Curb Forms — Vertical back with battered face
Integral Curb Forms
Integral Curb Forms
Flexible Radius Face Forms — For use with fixed radius back and gutter forms
Flexible Radius Forms — For curved work of variable radius
Fixed Radius Forms — For curved work when same radius is repeated
Sidewalk Forms

ONE set of Blaw-Knox Steel Forms handles *every* concrete curb, curb and gutter or sidewalk job, from simple straight work to serpentine or curved shapes. They are standardized for complete interchangeability! You can use them over and over again, in combinations to fit your needs for every type of street paving work . . . concrete curb, curb and gutter, integral curb, special curb or sidewalk. Blaw-Knox Steel Forms give you *better work* at *lower cost*. Finished jobs have a smooth perfection impossible to achieve with wood forms, and costly hand finishing is eliminated. Expensive carpentry on curves, always the most expensive and difficult to construct, is unnecessary. There's no time wasted waiting for wood forms to be built. Labor costs are cut to the bone. Blaw-Knox Forms are easy to set and strip, easy to handle and transport. Form maintenance is practically non-existent.

Get a set of Blaw-Knox Steel Forms now to insure more profit on your next job, and *all* future jobs.

SEND FOR THE NEW BULLETIN, No. 2259, for complete information on the Blaw-Knox Steel Street Form System. 28 pages of detailed illustrations show form set-ups for every type of work with complete instructions on how to use them. You can select the forms you need to speed completion of your work and make more money for you.

BLAW-KNOX

BLAW-KNOX DIVISION OF BLAW-KNOX CO., Farmers Bank Bldg., Pittsburgh 22, Pa.

New York • Chicago • Philadelphia • Birmingham • Washington

See Your Nearest Blaw-Knox Distributor

The Le Roi 52AJ Air-Jac paving breaker features an air-lift cylinder that utilizes line air pressure to lift the tool and free stuck steels.

Paving Breaker Has Integral Air Lift

A new type of heavy paving breaker, the 52AJ Air-Jac, has been announced by the Le Roi Co., 1706 S. 68th St., Milwaukee 14, Wis. This tool is a standard Model 52 80-pound paving breaker with an integral air-lift cylinder that utilizes line air pressure to lift the tool and pull stuck steels. The Air-Jac breaker is designed to relieve the operator of heavy lifting normally associated with 80-pound-class breaker operations.

The Air-Jac lift cylinder has a leg parallel to the breaker steel through which the lifting force of 100 pounds is exerted. After the bit penetrates the pavement in a normal manner, line air pressure is applied to the lift cylinder through a control at the breaker handle.

According to Le Roi officials, significant increases in breaking speed are realized, while less exertion is required by the operator.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 9.

Lightweight Engine

A new air-cooled 4-hp gasoline engine weighing 19 pounds complete is announced by Homelite Corp. of Port Chester, N. Y. It is designed for application where light weight and compact size are important.

The new No. 20 Homelite engine uses die-cast aluminum alloys for all major castings. Two-cycle design permits a minimum number of moving parts and simplifies maintenance and repair work. There are no exhaust valves, and only one rotary intake valve which is self-seating and requires no adjustment. The engine speed is controlled by a built-in governor. The float-feed carburetor is furnished with or without throttle. Other features include double-row ball bearings on the crankshaft and connecting rod, needle bearing on wrist pin, and high-tension Wico magneto. The engine may be used either horizontally or vertically. It is designed to develop 4 hp at 4,000 rpm and 3 hp at 3,000 rpm.

Further information on this new engine may be secured from the company. Or use the Request Card at page 16. Circle No. 45.

ASTM Annual Meeting

More than 185 papers and reports were presented at the 22 formal technical sessions, several informal sessions, and round-table discussions held during the 1949 Annual Meeting of the American Society for Testing Materials, in Atlantic City. This was the 52nd annual meeting of the Society, and notable progress was made in its research and standardization work in the field of materials.

On the recommendations of the ASTM technical committees, 77 new tentative specifications and methods were approved, and almost 100 previous tentatives are to be adopted as formal standards. Many other specifications and tests were revised and brought up-to-date. All of these will be published in the "1949 Book of Standards" to be issued late in the year.

There were a number of papers in the field of concrete and concrete aggregates. One interesting contribution covered the engineering properties of coral-reef materials. Inge Lyse, for many years at the Norway Institute of Technology, discussed concrete for airport runways, and suggested a novel method of construction.

The Sanford E. Thompson Award, for a paper of outstanding merit on concrete and concrete aggregates, was given to R. C. Mielenz and L. P. Witte for their 1948 paper on "Tests Used by the Bureau of Reclamation for Identifying Reactive Concrete Aggregates".

Form-Lining Tacker

Information on the Duo-Fast handgun tacker for form lining has recently been released by the Fastener Corp., 866 Fletcher St., Chicago 14, Ill. The literature describes the automatic tacking tool and recommends it for fastening facings and protective material to forms or for similar operations. The Duo-Fast tacker uses a ⅜-inch staple.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 1.

Winslow BINANBATCH
—Reduces Your Job Cost
Use with a
10S - 11S - 14S - 16S Mixer

Complete—with scale for two or three aggregates.
With two or three overhead storage bins.
For use on culvert—bridge—curbing—foundation jobs.
Wherever above size mixers are in operation.
PROMPT DELIVERY — WRITE OR WIRE

Mfrd. by
WINSLOW SCALE CO.
TERRE HAUTE, IND.
Distributors Located throughout U.S.

PROFITS ROLL IN
WHEN YOU ROLL ON THE JOB WITH A BANTAM

The BANTAM mounts on any 1½ ton truck chassis or larger. Drives up to the job and digs in. Finishes one job at a profit-making pace and speeds on to the next without losing time. It's a money-maker in tight quarters . . . a fast worker in digging water and sewage systems, drainage ditches, basements, and handling sand, gravel, and other construction materials. Interchangeable booms and buckets make the BANTAM 7 machines in one. It is quickly converted *on the job* for a wide variety of operations.

As a shovel or dragline the BANTAM will load to 60 yards per hour under normal conditions. When used as a trench hoe it will dig 100 feet of five foot ditch per hour. Crane capacity—five tons. Its profit-making ability teams up with mobility, economy and soundness of design to make the BANTAM a money-maker for any contractor.

Write for complete information

The SCHIELD BANTAM CO., Inc.
200 PARK AVENUE WAVERLY, IOWA

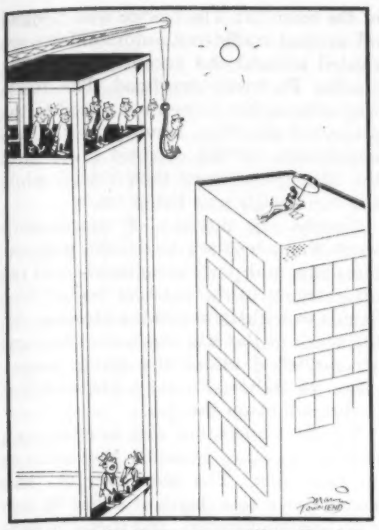
Sold and serviced by leading construction machinery distributors throughout the United States, Canada, and Foreign Countries.

IMPROVED SWING SHAFT ASSEMBLY

PATENTED TRIPLE ACTION BOOM HOIST

THE 1/3 YARD SCHIELD BANTAM

TRUCK MOUNTED TRENCH HOE • SHOVEL • CLAM • DRAGLINE • PILEDRIVER • CRANE • MAGNET



"Well, at least we are getting the top finished in record time."

Committee to Study Colorado's Highways

Governor Lee Knous of Colorado has appointed a 19-member committee to draw up a long-range highway program for the state. The appointment was announced July 29.

The committee is to be composed of 8 legislators and 11 laymen from groups especially concerned with improving the highways in the state.

"The work of the committee is of the utmost importance in the development of a highway system for the state," Knous said, in announcing the appointments.

"It is hoped that the committee will take every opportunity to learn of the highway needs of the various parts of the state, and will afford full opportunity for the different communities in the state to present those needs."

Urging realistic planning, Knous said, "A long-range program should be based upon a realistic approach, balancing actual and reasonably anticipated needs with the willingness of the taxpayer to pay the cost."

Knous termed the need for a highway planning program "an emergency". He said both the State and the Federal government will provide the money to complete the study.

The Highway Advisory Board passed a resolution in May recommending the naming of this committee by Knous. Mark U. Watrous, State Highway Engineer, has also expressed the need for such a program. Knous said full consideration was given to geography in selecting members of the committee, and to their representation of various industries.

"The study should review the existing classifications of road systems in the state, to insure that all roads are properly grouped in accordance with the traffic and benefits rendered," Knous explained.

"The study should provide for a proper allocation of highway funds to the political units responsible for construction and maintenance of roads, streets, and bridges for which they are held responsible.

"It is hoped that this committee, which is appointed in almost the exact manner as proposed in legislative bills, will be able to present to the next General Assembly a comprehensive, long-term plan for the development of a highway system for the benefit of the entire state, of all industries, and all the people."

Houston Plant for Foster

The L. B. Foster Co., steel concern of Pittsburgh, Pa., recently opened a new warehouse at Houston, Texas. The plant is on a 12-acre site in the Burchfield industrial district.

The Houston office, headquarters for the southwest, will cover the states of Mississippi, Louisiana, Texas, Oklahoma, Arkansas, Arizona, New Mexico, Colorado, Utah, California, and Nevada; the southwest portion of Kansas; and Mexico.

Non-Metallic Woven Tape

A folder on Phoenix Wyteface non-metallic woven tape is offered by Keuffel & Esser Co., Adams and Third Sts., Hoboken, N. J. This tape is woven from specially developed synthetic materials. The markings on a white background are black for graduations and subnumbers, and red for foot numbers. A plastic coating protects the tape and the markings.

The tape is 5/8 inch wide. It is available with graduations in feet, inches, and half-inches; or in feet, tenths of a foot, and half-tenths of a foot. It comes in lengths of 25, 50, 75, 100, and 150 feet. A price list and a sample of the tape are included in the folder.

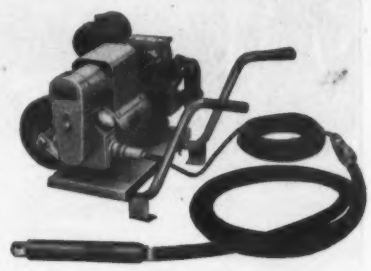
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 153.

LIGHTER . . . EASIER TO HANDLE . . .

you place concrete *FASTER* with a

MAGINNISS

HI-LECTRIC CONCRETE VIBRATOR



WHY? Because there's no flexible shaft! No engine to move! The Generator is set off the job, out of the way. Only a lightweight cable runs to the vibrator. One man operates it, the On-Off switch is at his fingertip. 9,500 VPM with no power loss insures faster and more uniform concrete placement.

SAFE? Sure, because generator and motors are wound for 110 volt, 180 cycle operation, and are grounded.

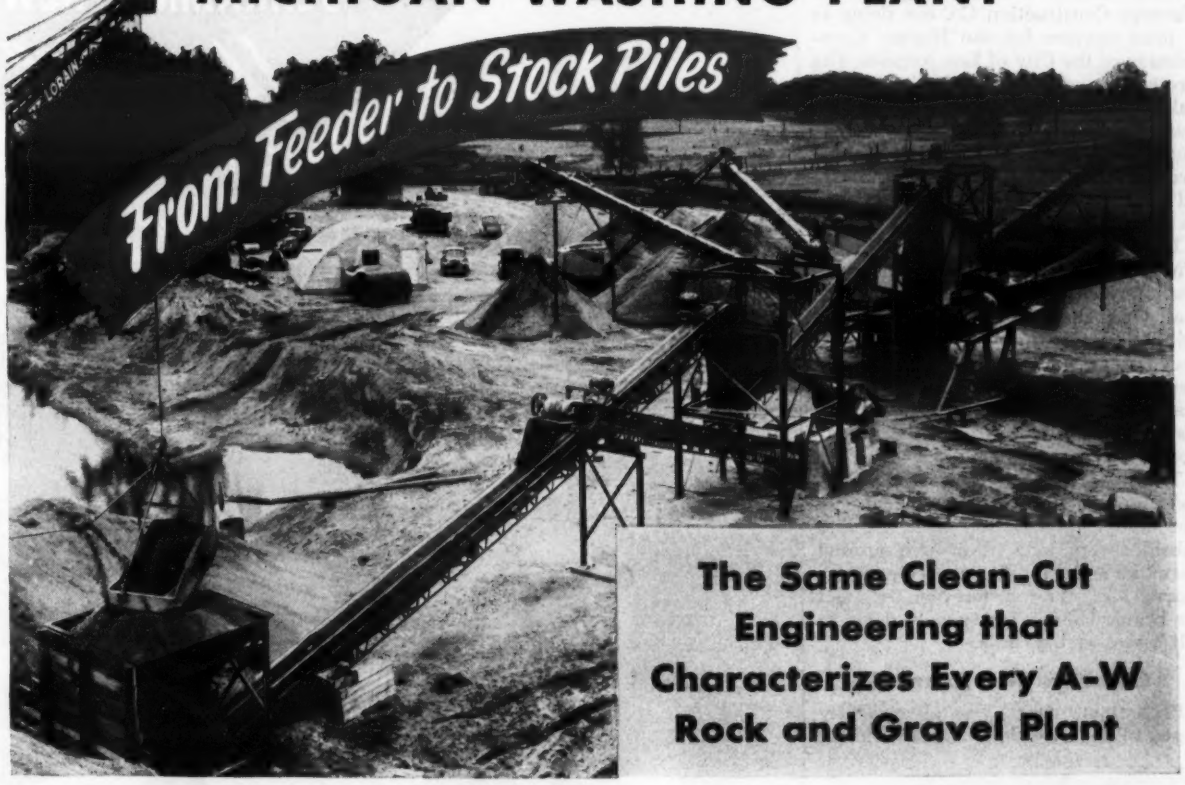
—EXTRA FEATURES—

The Hi-lectric Generator operates 2 vibrators, as well as standard floodlights and Hi-lectric Saws and Grinders. Versatility, light weight, low operating and maintenance cost are just a few of the many advantages of Hi-lectric equipment.

Maginniss POWER TOOL CO.

129 DISTL AVE., MANSFIELD, OHIO

MICHIGAN WASHING PLANT



The Same Clean-Cut Engineering that Characterizes Every A-W Rock and Gravel Plant

Here is a complete gravel crushing, screening and washing plant for the production of aggregate for use in building or highway construction.

With the sizes of units used, total plant capacity is approximately 100 tons per hour. If desired, larger units could be used to increase production to 200 tons per hour, or more.

The enlarged and flared lower end of the tank provides the large settling area that is necessary to reclaim fine sand.

The plant has facilities which insure the production of properly washed and graded aggregate—a fine and a coarse sand, and two sizes of stone. If desired, additional sizes of product can be made.

Because of the simple arrangement, operating costs are held to a minimum. One man is all that is needed to operate the plant. A generator set provides power for the entire plant, including a water pump using about six gallons of fuel per hour.

Two Eagle Fine Material Screw Washers, of the type shown in the accompanying photograph, operating in series, deliver the two sizes of clean graded sand. Similar washers, but without the flared lower end, are used for the stone, to insure the thorough scrubbing action which guarantees clean rock.

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.

BUILDERS OF ROAD MACHINERY SINCE 1850

Austin-Western

6,000-Ton Bridge Raised 7.5 Feet

Terminal Island Bascule Raised on 375-Ton Jacks To Take Care of Unusual Settlement Problem

✦ WORKING around the clock, bridge-raising experts elevated the heavy 6,000-ton Terminal Island bascule bridge 7½ feet in the amazing time of 5 days. The short time limit was necessary so the route of Union Pacific trains across Cerritos Channel towards Terminal Island, near Long Beach, Calif., would not be impaired a minute more than necessary. The heavy lift was made on only 24 hydraulic jacks, each with a capacity of 375 tons, and the bridge came up about an inch every 3½ minutes.

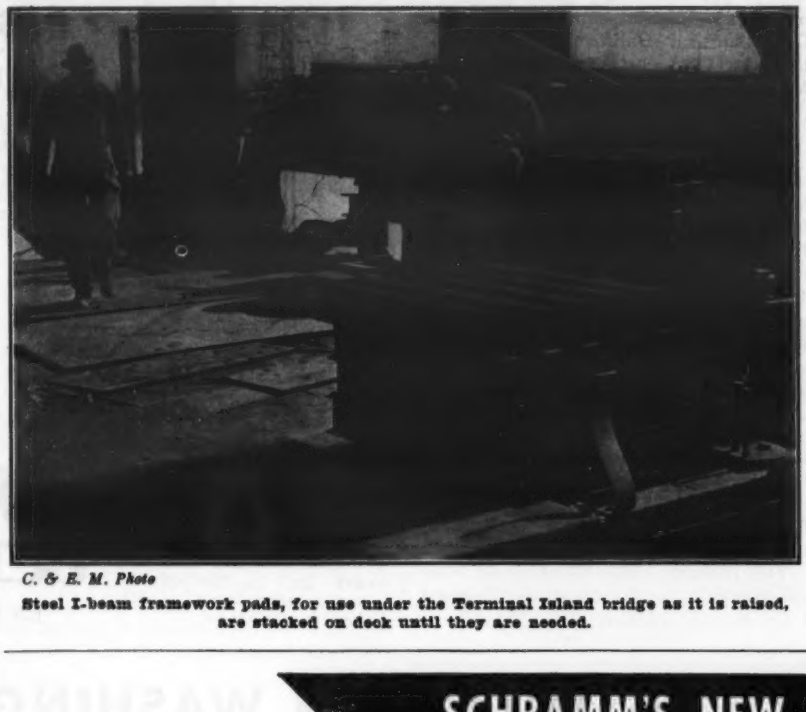
The operation is a part of a general $479,000 bridge-rehabilitation contract which Johnson-Western Co. and the Tavares Construction Co. are doing as a joint venture for the Harbor Commission of the City of Los Angeles. The project included raising the bridge, the rail, and roadway approaches about 7½ feet; reinforcing the bridge structure and adding new struts; paving the approaches; and general clean-up. Started last September, the job was finished in March, 1949.

Under a separate contract with the Union Pacific Railroad Co., the contractors also built 800 feet of concrete wall on each end of the bridge to retain 6,000 cubic yards of earth fill which they placed between the walls incidental to the raising of the railroad tracks. The fill and the track raising also took place within the 5 days mentioned earlier.

Through the years, the old double-bascule bridge, built in 1924, had settled about 6 feet, due to a general subsidence of a circular area around Terminal Island. When the contractors moved in to the job, the pier tops and the bridge bearing plates were down in salt water at high tide.

Operations Well Arranged

Preliminary work was all carefully gaged to tie in properly with the timing of the main lift. The bridge was blocked off to road traffic and automobiles were routed around the recently completed Harbor Parkway overhead. The roadway approaches were then raised to the projected elevation, leaving the railroad approaches at the original level until the lift. These were then raised while the bridge lift was being made.



C. & E. M. Photo

Steel I-beam framework pads, for use under the Terminal Island bridge as it is raised, are stacked on deck until they are needed.

Nearly six months of preparatory work was necessary to design, procure, fabricate, and place structural-steel reinforcement of the existing bridge floor beams to withstand jacking stresses. All the work at the site was correlated and accomplished under the direct supervision of Robert Fontana, General Superintendent on the job.

The first operation was to open up a jacking location beneath the columns on each pier. The pier concrete was scaled down to a depth of about ¾ inch with pneumatic guns, and then the concrete was removed under each steel column far enough to accommodate a 1-inch steel plate, 3 x 4 feet. This plate

(*Continued on next page*)

The Lighthouse of the Highway
EMBURY
Traffic Gard
The Warning Lantern with the SAFETY BEAM

Order through Your Jobber
EMBURY MFG. CO., WARSAW, N. Y.

SCHRAMM'S NEW
Unistage
COMPRESSOR
RESULT OF 50 YEARS ENGINE and COMPRESSOR MANUFACTURING

SCHRAMM
MODEL 105
Unistage
GASOLINE ENGINE DRIVEN COMPRESSOR

- Easier, cleaner air because it is watercooled.
- Lower fuel consumption with Pneumostat saving up to 50%.
- Eliminates intercooling with its manifolds, gaskets, etc.
- Entire unit built by SCHRAMM, therefore, one responsibility.
- Design includes mechanical overhead valves.
- Eliminates two staging with its difficulties in servicing.
- Engine and compressor parts largely interchangeable.
- Designed for continuous 24 hour service.

SIZES INCLUDE 20—35—60—105—210—315—420—Cu. Ft. *WRITE FOR BULLETIN 4915*

SCHRAMM INC. THE COMPRESSOR PEOPLE • WEST CHESTER • PA.

was set in and grouted so it could not move. The bridge has four supporting piers, two under each bascule leaf, and six jacks were assigned to each pier. Two jacks were placed under each column.

Next the big hydraulic jacks, with a ram area of 70 square inches and a stroke of 8.75 inches, were brought in and installed. They had been designed by Haskell Engineering Co. of Glendale, and manufactured by the Loud Pump Co. at Pomona. One of the interesting features of the design was the fact that the jacks were retractable by a turn of a valve. Thus they were set in place and the jack head was bolted to the bridge steel, in order that the jacks could lift themselves by the bootstraps, so to speak, at the end of each stroke.

The jacks were connected to electric-driven pumps—also specially designed and made up with extra-strength tubing. Stainless-steel tubing with a strength of 15,000 psi was used on the high pressure side, and 1,500-pound double-strength copper tubing was used on the return line. Pumps and jacks were designed to operate at 10,000 pounds of pressure. Six jacks were hooked to each pump.

Other preliminary arrangements included drilling in and grouting steel dowel bars, and such reinforcing steel for pours as would not interfere with the men as they tended the jacks while the bridge was raised. High tides occasionally deposited an oil slime on the cleaned concrete, but the surface was rebrightened with muriatic acid.

Before the first lift, a concrete-pour form was suspended around each pier, hung by cables from the bridge deck members. This form was faced with plywood nailed to 2 x 4 studs. The cables thus raised this form as the bridge deck came up. The forms were only about 3 feet high, because concrete pouring was planned after every 2½-foot lift.

Another of the unusual aspects of this heavy lift was the fact that the new concrete was not expected to support any of the bridge weight. As the lift proceeded, the weight was all taken up on special grilled frameworks made of 7-inch I-beams welded together.

Plumb bobs were hung from each corner of the bridge to make sure the heavy lift went up properly. Four survey boards were also set up, two at each shoreward end of the bridge, calibrated to the hundredth of a foot. A metal pointer fastened to stationary parts of the bridge indicated the exact position of the lift at all times, and the amount of lift. Gages were also placed down on the piers, because this was an all-important point.

All Hands Man Your Stations!

The actual raising of the bridge was as exciting as a shoot-em-up thriller.

Carlos Tavares, a brilliant, bridge-wise engineer and contractor who achieved fame by raising the Bridge of the Gods across the Columbia River above Bonneville Dam, stationed himself on the north bascule leaf.

C. & E. M. Photo
This photo shows how one of the jacks on the bridge-lifting job was set up.

L. J. Sullivan, General Manager for Johnson-Western, took the south leaf. An electrical loud-speaker system was installed to alert the entire working area in case of an emergency. Telephones were installed between the piers and the pump operators. The same relay system connected the operators with the two men in general charge.

Down on the piers, each crew was under the supervision of a foreman, connected by telephone to the pump operator for his pier. This foreman had a megaphone in order to reach clearly every man in his crew.

Always smiling, always optimistic, Tavares gave the men their orders—and their tolerances.

"She wants to come up level, now, men," he said. "We'll hold her to a tolerance of ¼ inch sidewise, and 1 inch lengthwise of the deck. Let's go."

The pump operators pressed their electric control push buttons, and the pumps began to hum. Slowly the big jacks took hold, and the bridge came clear of the concrete.

C. & E. M. Photo
After a 2½-foot lift, workmen pour concrete from the upper deck of the bridge. The surveyor's gage in the photo indicates how far the bridge has been raised.

When the bridge was ¼ inch in the

(Continued on next page)

For the Finest in Chain Saw Performance — Lombard Model 7 Two Man Saws with new Warren High Speed Chain

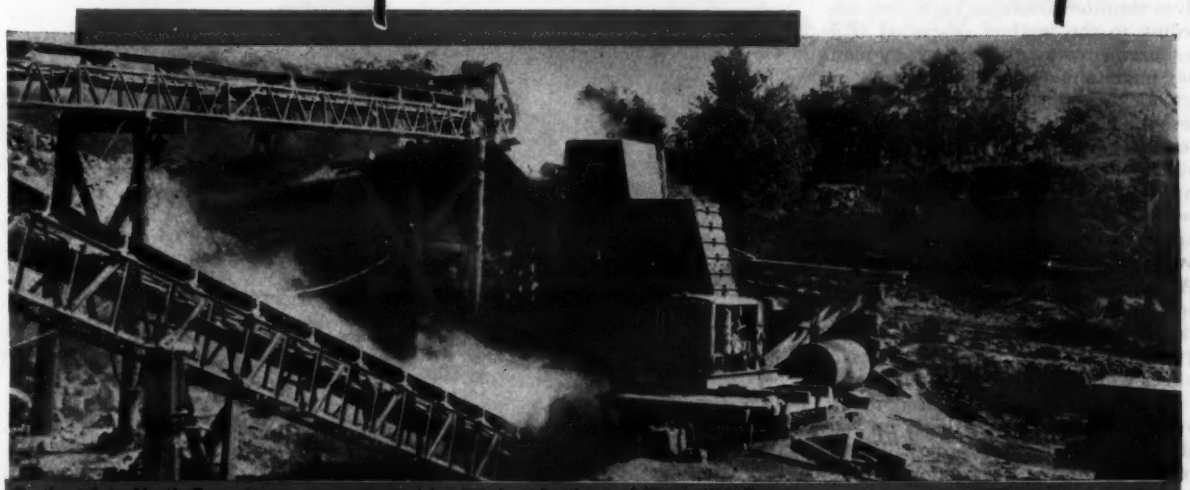
Dealer opportunities in some areas.

- Cuts easier because of governed chain
- Cuts faster result of unique plow-shaped teeth
- Cuts longer without dulling Teeth made of tool steel
- Local demonstration arranged!

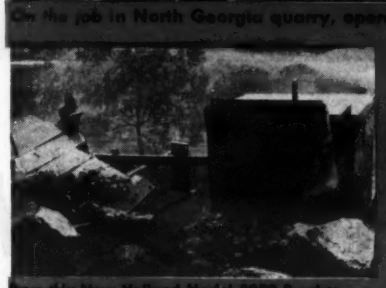
Also Sensational New One Man Saw
LOMBARD GOVERNOR CORP.
ASHLAND, MASSACHUSETTS

In Georgia limestone . . .

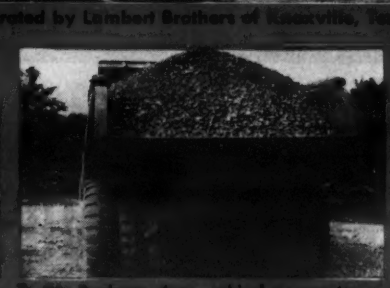
Dual Impact Action does it again



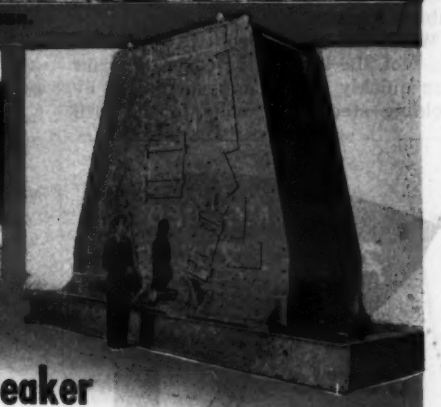
On the job in North Georgia quarry, operated by Lambert Brothers of Knoxville, Tenn.



From this New Holland Model 5050 Breaker accepts run-of-quarry rock up to 50"...



To this Produces clean, cubical aggregate passing -6" in one operation . . .



New Holland Model 5050 Double Impeller Breaker

reduces 50" material to commercial sizes in single pass . . .

● **Like all New Holland Breakers,** the new Model 5050, recently installed by Lambert Brothers, is a field development . . . designed to work in all types of rock, under all conditions . . . built to produce maximum aggregate at minimum cost. Simple, sturdy construction keeps costs *down*—production *up*.

Here are some quick facts—more on request:
Produces up to 400 tons per hour on 300 h.p. Heavy duty steel outer plates. Interior lined with manganese steel wear plates. Spherical roller bearings. All parts accessible; all adjustments easily made by average workman. Mounted on heavy I-beams to simplify installation. Weight 54 tons.

New Holland Double Impeller Breakers are used, recommended by operators everywhere. Get the facts. Write for complete information including location of installation nearest you. Address: Department C-99.

Read what W. E. Lambert, of Lambert Brothers, Knoxville, Tenn., says about New Holland Model 5050 Double Impeller Breaker shown above.

"The ability of this breaker to reduce 50" material to commercial sizes in one pass is remarkable . . ."

W. E. Lambert

NEW HOLLAND DOUBLE IMPELLER BREAKERS

NEW HOLLAND MANUFACTURING COMPANY, MOUNTVILLE, PA.

Affiliate of the Sperry Corp.

6,000-Ton Bridge Is Raised 7.5 Feet

(Continued from preceding page)

clear, men began to place the supporting material. They slipped in ¼-inch steel shims. When the bridge was up another ¼ inch, the first shim was slipped out and a ½-inch piece of steel slid in place. The placing of this shim stock was purely a safety precaution so the bridge could not possibly drop more than ¼ inch if something went wrong.

This process was repeated until the jacks had raised the bridge 7 inches in the clear. At this point the safety material was quickly removed under one column at a time, and one of the prefabricated I-beam grills was set in place on the bearing plate. It was welded down tight so it could not possibly move. When all four on each pier were in, the direction of the jack was reversed and each jack raised itself 7 inches in the clear of its original bearing plate. A jacking grill similar to the bearing assembly was then slipped under the jack and welded down to the jacking plate. This made the jack ready for another 7-inch lift.

Also on hand was very thin shim stock to be built up under each bearing assembly before the jacks were lowered. The massive structure had to be handled carefully, without shock.

Jacking operations repeated themselves simultaneously on each pier, according to the method described. The pier foremen were especially busy men. They maintained a constant check on each jack. A difference of more than one ¼-inch shim on a pier meant quick telephone orders to the pump man to slow down the high side and build up the low. At each end of the bridge, Tavares and Sullivan maintained night-long vigils to keep the 6,000-ton weight moving steadily and evenly.

As the bearing and jacking grills were installed one on top of the other, welders fused them with electric welding rod so they could not move. No chances were taken. When the hydraulic oil in the first lift appeared to be too heavy and pressures built up too high, a very light hydraulic oil was substituted, to reduce friction in the tubing lines.

When the bridge deck was up about 2½ feet, the base of the concrete forms was quickly tied in snug and tight by welding steel form bolts to the grill steel and to the other reinforcement. Reinforcing steel was placed. Concrete then came in from the Consolidated Rock Supply Co. commercial plant by truck mixers, was discharged to a Gar-Bro transfer hopper, and buggied to trunk hoppers above the pours. A rich 7.23-sack mix was used, and the old concrete was washed with thin cement grout to get the best possible bond. The mix consisted of 172 pounds of sand, 67 pounds of 1½-inch rock, 123 pounds of ¾-inch rock, and 81 pounds of ⅜-inch rock per sack of cement.

C. & E. M. Photo
A commercial truck-mixer brings the concrete used to build up the bridge piers.

The concrete work set up quickly and served to steady the bearing grillwork for the next lift.

Jacking the Approaches

The bridge roadway approaches, and later the railroad approaches, were also raised by jacks. The actual work of jacking was done under a subcontract with Star Housemoving Co., but the fabrication and placing of the 14 x 14-inch creosoted-timber pony bents were done by the main contractor.

To get a start, the piles of one bent were first sawed off about 12 inches and 35-ton house jacks were set in place. The lifts were then made by jacking off alternate bents. Pony bents were set in place and braced as the work progressed. These were handled by a Lorain Moto-Crane.

Other work on the job included routine curbs, paving, and roadway approach fill which were done under a subcontract by Griffith Brothers. Structural-steel work was done by the Na-

(Concluded on next page)

Picking it up and laying it down . . . in one continuous operation . . . with the

H&B Moto-Paver and Moto-Loader

Showing aggregate being dumped directly from truck into front hopper of the Moto-Paver.

Where it is necessary to use aggregate that has been windrowed on the road surface, the H & B Moto-Loader, used in conjunction with the Moto-Paver, gives highly efficient results. The Moto-Loader is small, inexpensive, readily portable and designed specifically for this purpose. It is propelled by the Moto-Paver, and is equipped with a 25 hp engine for driving the gathering flights and bucket line. Blade height, with relation to the road, is adjustable by a simple hydraulic mechanism, assuring clean pick-up at all times.

The aggregate may also be dumped directly from trucks into the front hopper of the Moto-Paver, as shown in the illustration at the left. In either case, uniform results are obtained, because the proportioning of the aggregate and bitumen is done in the machine and is not dependent upon the uniformity of the windrow. The mixed material is spread and struck off on the road surface, ready for rolling. Write for Bulletin MP-47

HETHERINGTON & BERNER INC.
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H & B builds portable and stationary asphalt plants of all types, sizes and capacities

PRE-MOLDED
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Seals VERTICAL JOINTS

Now you can seal vertical and overhead joints with Pre-molded Para-lateral Sealing Strips, quickly, easily and economically. Para-Plastic Sealing Strips can be installed on finished concrete, or they may be attached to the form and concrete poured up to it. Pre-molded Para-Plastic Strips have the same cohesive, adhesive and resilient qualities as our widely known Hot-Poured PARA-PLASTIC rubberized asphalt joint sealing compound.

SERVICISED QUALITY PRODUCTS 1939

Write for complete details of this TIME and COST-SAVING watertight seal for those "tough" applications.

SERVICISED PRODUCTS CORP.
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tional Iron Works.

Initial planning and designs for the job were done by R. Howard Annin, Consulting Structural Engineer. Mr. Annin also spent a great deal of time personally in the field, to make certain that the job proceeded safely according to plan. It was one of the heaviest single lifts to be made with jacks in California for a long time.

The job renders the 25-year-old bascule bridge serviceable again, and opens Cerritos Channel to water-borne traffic which had stopped for several years while the bridge was jammed shut.

Air-Cooled Diesel 5-KW Electric Plant

A new 5,000-watt ac diesel electric plant, Model 5DRP, has been announced by D. W. Onan & Sons, Inc., 43 Royalston Ave., Minneapolis 5, Minn. The plant's vibration-free operation, the company states, is due to the prime mover: a new opposed-two-cylinder air-cooled diesel engine. Integral shock mountings are said to make it possible to operate this unit on the floor. The plant's dimensions, 38¾ x 30¼ x 26⅛ inches, indicate its compactness. The 5DRP weighs 725 pounds without batteries, and is available in 50 or 60-cycle and in all standard voltages.

Standard equipment includes: two 6-volt starting batteries, battery cable, hydrometer, mounting rubbers, 5-gallon fuel tank, 2 flexible fuel lines, muffler, 2 oil-bath air cleaners, fuel filters, 2 air heaters, one remote station, and an instruction book. A 55-gallon or 110-gallon underground fuel tank and fittings, 3-conductor start-stop wire, and 5/16-inch copper-tubing fuel lines are listed as optional equipment.

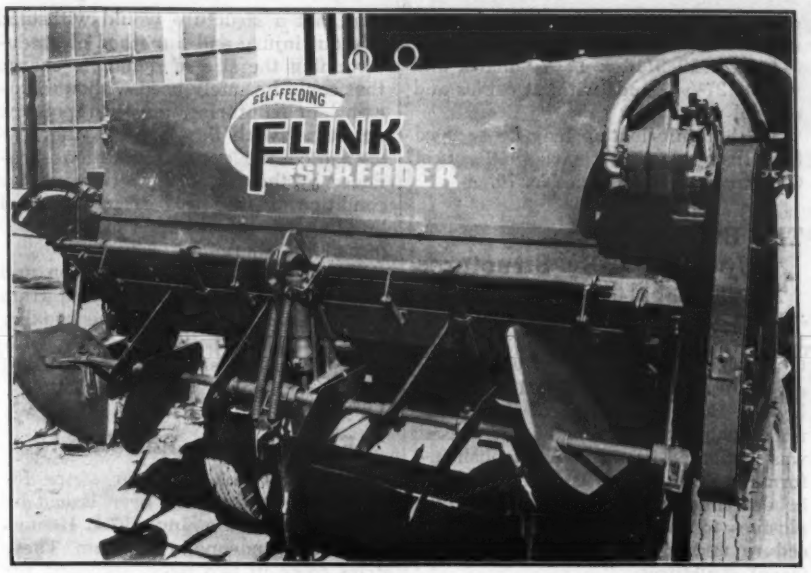
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 32.

A New Gate Control On Material Spreader

A new hydraulic gate control for the company's self-feeding material spreader has recently been developed by the Flink Co., of Streator, Ill. The amount that the gate is to open is set on the lever and gage at the extreme left side of the spreader. The cylinder for this control is in the center and is connected to the same hydraulic system that operates the spreader. The lever in the cab that controls the starting and stopping of the spreading operation also controls the opening and closing of the gate.

If, for any reason, the hydraulic gate control should fail to operate, the cylinder can be quickly disconnected for manual operation. A feature of the gate control is that the cylinder is welded shut. This sealed-in construction is designed to prevent any of the material being spread from getting inside the cylinder.

Further information on this new gate control may be secured from the company. Or use the Request Card at page 16. Circle No. 75.



A new hydraulic gate control has been developed by Flink for its self-feeding material spreader. At left are the lever and gage where the amount of gate opening is set. In the center is the cylinder for this control.

Steel Utility Buildings

Catalogs on the USF all-steel utility buildings may be had from United Steel Fabricators, Inc., of Wooster, Ohio. The buildings are described as weatherproof, permanent, fire-proof, and termite-proof. Adaptable to individual needs, they come in standard widths, heights, and length multiples. These length multiples may be added as necessary.

The folders point out that the structural framework is made of heavy-gage formed steel and the roof and side walls of deep box-type corrugated sheets. These sheets are fastened together by clip and wedge connectors to permit easy, economical dismantling and relocation.

This literature may be obtained from the company, or by using the Request Card at page 16. Just put a circle around No. 60.

MOUNT FORM LININGS TO WOOD FORMS
with the
DUO-FAST STAPLE TACKERS

DRIVES STAPLES 1/2" WIDE 3/8" LONG ACCURATELY SECURELY

Widely used for the mounting of thin, absorptive form linings, such as HYDRON, in the concrete curing process. Fast, easy, one-hand operation. Simplify your job with Duo-Fast.

For Further Information write to

FASTENER CORP., Chicago 14, Ill.

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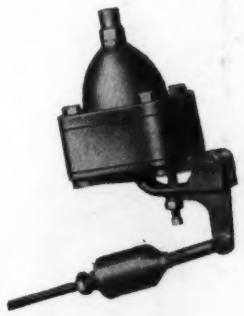
A New Floating-Speed Regulator for DRILL-MORE CAPACITY CONTROL



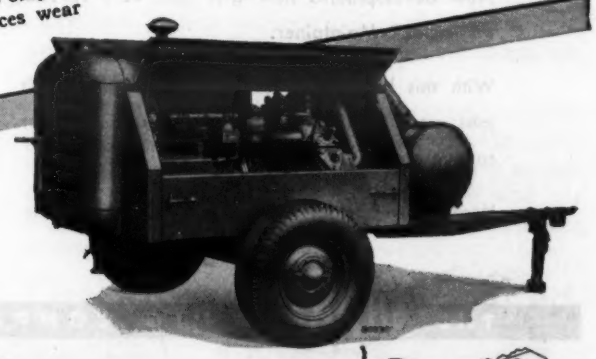
The UL-83 *Floating-Speed* DRILL-MORE Regulator retains all the advantages of Ingersoll-Rand's *original* Multi-Speed DRILL-MORE control for portable compressors, and provides many other superior features.

It automatically sets the exact and lowest practical compressor speed that delivers just enough air to maintain a constant air pressure. The speed "floats" with the demand for air.

- **Saves up to 40% in Fuel** by eliminating wasteful idling and always compressing the needed air at the slowest possible speed.
- **Holds 15- to 20-psi Higher Air Pressures.**
- **Up to 30% More Drill Power** . . . More Work from air tools.
- **Floating-Speed** . . . Eliminates speed steps . . . saves still more fuel.
- **Easier to Adjust** . . . Fewer parts . . . simpler in operation.
- **Compressor Loads and Unloads Only at Low Speed** and after reloading, speeds up only as much as needed . . . saves fuel, reduces wear and tear.
- **Reduces Maintenance** . . . Slower average compressing speed . . . unloaders operate fewer times . . . longer life of all parts.
- **Controls Engine Governor Instead of Carburetor** . . . Automatically compensates for temporary irregularities and prevents stalling.
- **Automatically Holds Engine at Low Speed During Starting** . . . Eliminates hand adjustments.
- **Ideal for Parallel Operation** of *unlimited* number of machines discharging into a common header.

Now standard on all KA-Series

105, 160, 210, 315 and 500-cfm sizes



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Use the CR CONTRACTORS' COMBINATION

- Everything you need for rock drilling.
- Top quality machines that work as a team.
- Machines designed, built, sold, and serviced by men who know rock excavation . . . application "know how"

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11 BROADWAY, NEW YORK 4, N. Y. 414-2

AIR POWER The Key to Lower Costs

Radiotelephone Unit Meets New FCC Rules

A mobile radiotelephone unit which complies with the new rules and regulations of the FCC—effective July 1, 1949, and July 1, 1950—has been developed by Federal Telephone & Radio Corp., 100 Kingsland Road, Clifton, N. J. Designated the FT-145-10, the new unit has a power output of 10 watts at any frequency in the 152-162-megacycle band. It features modulation limiting.

Modulation limiting, one of the principal items in the new FCC regulations, has been built into the Federal unit as an integral part of the circuit. It eliminates interference due to overdeviation, which causes the so-called "spill-over" from the operating channel to the adjacent channels. It is a step towards closer practical operation on adjacent channels in the same area.

Designed to meet RMA test recommendations, the mobile radio draws 7.3 amperes stand-by and 23.9 amperes transmitting; it thereby allows in many cases the use of existing batteries and generators. It has an overall size of 5 5/16 x 12 3/16 x 14 ⅛ inches and weighs 27½ pounds without cables and control unit.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 76.

The Effect of Blasting Upon Near-By Structures

A valuable 24-page booklet titled "Ground Vibration Due to Blasting And Its Effect Upon Structures", by F. J. Crandell, has been issued by the Liberty Mutual Insurance Co., 175 Berkeley St., Boston 17, Mass. The research upon which this pamphlet was based was instigated in order to establish information that will assist the contractor in determining a safe charge of explosives to use in his excavation procedure and insure no damage to adjacent structures.

The objective of the staff was to determine the amount of ground vibration that a structure would withstand without injury and a method of predetermining the size of dynamite charge that could be safely used without damaging or rupturing any part of the structure. With this in mind, they investigated the ground vibrations produced by the use of explosives and the condition, before and after firing, of buildings within a range of 25 to 250 feet of the charge.

The results of the investigation and conclusions that may be drawn from them are also included in the booklet, which may be obtained by writing the company, or by using the Request Card at page 16. Circle No. 50.

For Grouser Retreading

A bulletin about tractor strips for grouser retreading has been issued by Marquette Mfg. Co., Inc., 307 E. Hennepin Ave., Minneapolis 14, Minn. These strips come in two sizes: standard, for medium and small tractors; and an extra-heavy bar, for medium and large-size tractor treads.

The catalog sheet gives the dimensions and weights of each size. It also gives the number of feet of tractor strip required for Allis-Chalmers, Caterpillar, Oliver Cletrac, and International Harvester tractors. It tells how to weld the strips and suggests the rod to use.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 143.

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PLENTY OF RESERVE POWER . . .
. . . MORE POWER THAN EVER!

New developments now give you 42½ H.P. in the HUBER Maintainer.

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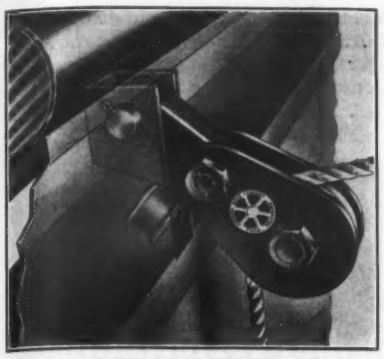

The new tailboard adapter, made by the Johnson Block Co., is installed as a permanent fixture in the truck bed.

Tailboard Adapter With Snatch Blocks

A new tailboard adapter for use in skidding and ginning operations has been announced by the Johnson Block Co., 320 W. First St., Tulsa 3, Okla. It is installed as a permanent fixture in the truck bed; and in combination with the Johnson standard snatch block, it is designed to meet all conditions where it is necessary to run a line direct from a winch drum over a tail-block sheave to the load to be skidded into position. The tail block may be converted to a standard snatch block simply by attaching the regular hook or shackle assembly, which are also interchangeable.

The manufacturer states that this new design lowers first and installation costs. When the tail block is removed, the adapter drops into a recess provided, leaving no projections above the truck bed to interfere with regular loading operations.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 126.

An Engineering Handbook On Composite Construction

A second edition of the "Alpha Composite Construction Engineering Handbook", a design manual for bridges and buildings, has been released by the Porete Mfg. Co., Porete Ave., North Arlington, N. J. Replacing the first edition of 1940, this handbook presents the theory and design procedure of Alpha composite construction, with examples, formulae, tables, and illustrations.

The advantages claimed for composite construction are: greater economy except for short spans, shallow construction, reduced live-load deflections and vibration due to greater stiffness, and a greater live-load factor of safety.

The spiral shear connectors which are used in the Alpha composite construction were designed and are patented by the Porete Co. Copies of this handbook are available from Porete at a cost of $2.75.

Stock Sprocket Catalog

The enlarged line of stock sprockets and single and multiple-strand Diamond roller chains is described in a new 40-page catalog, No. 709, just released by the Diamond Chain Co., Inc., 402 Kentucky Ave., Indianapolis 7, Ind. This catalog supersedes Catalog No. 598. It gives data appropriate for selecting sprockets and chains; and includes illustrations, dimensions, and prices.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 48.

Richkraft Ups Wroble

The Richkraft Co. of Chicago, Ill., manufacturer and distributor of reinforced building papers and road-curing blankets, has appointed Lester R. Wroble Assistant Sales Manager. His new position will be that of assistant to the President, F. A. Richards, and will involve hiring and training Richkraft salesmen, appointing and training dealer salesmen, and acting as a personal distributor contact.

Book on Plain Concrete

The new third edition of "Plain Concrete" by Edward E. Bauer, Associate Professor of Civil Engineering, University of Illinois, has just been published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. This edition contains information on all significant developments in concrete and concrete materials that have occurred since the publication of the second edition in 1936.

The principal changes in the text have been made to incorporate the latest information on air-entrained concrete. The ASTM specifications, which have been completely rewritten to provide now for five types of non-air-entrained portland cement and three types of air-entrained portland cement, are included in this edition.

The price of this book is $5.00.

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Low overall height, low center of gravity, carefully designed load placement and wide-spread rear wheels give these scrapers exceptional stability for working steep slopes, for speedy moves from cut to fill. Big low-pressure tires provide large ground-contact area for superior flotation in soft footing. Double-disc drum-type wheels mounted on tapered, sealed anti-friction bearings mean low rolling resistance, and the streamlined goose-neck leaves ample front wheel clearance for short turns.

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Capacities from 4 to 22 cu. yd.

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See Your INTERNATIONAL Industrial Tractor Distributor

The Mall, in London, gets a new surface—a red asphaltic carpet. That's a Barber-Greene finisher laying it, with Queen Victoria looking on.

Resurfacing Work On the British Mall

If there is one thoroughfare which can be called the very center of the British Empire, it must surely be The Mall in London—the Processional Way by which the Sovereign has for nearly 200 years left Buckingham Palace on state occasions. In addition to its importance as the first part of the Royal Route, The Mall is a direct east-to-west throughway, relieving congestion in Piccadilly, the Haymarket, Whitehall, and Victoria Street.

This stretch of road has recently been reconditioned with a red asphaltic carpet from Admiralty Arch up to the gates of Buckingham Palace, including the area around the Queen Victoria Memorial. Although colored asphalt has been used in the northern part of England on several main roads for some years past, this is the first time it has been used in a large way in the south.

The major part of the Ministry of Works contract, which included lifting and disposing of the old wood-block surface, was done by The Limmer & Trinidad Lake Asphalt Co., Ltd., of Steel House, Tothill St., Westminster, S. W. 1. This company also manufactured and supplied the materials for resurfacing, from its depot at Trinidad Wharf, Fulham. Preparatory work of resetting curbs, re-grading approximately 6,000 cubic yards of footway, and installing new cable ducts, was subcontracted by Messrs. J. Mowlem & Co., Ltd., of 91 Ebury Bridge Road, S. W.

Following the removal of the wood blocks, a 3-inch base coat was laid. It consisted of gravel, sand, and asphaltic bitumen. The pigmented wearing surface, 1 inch thick, consists of red granite with limestone-dust filler and Trinidad Lake asphalt as the cementing material. A mixture of pre-coated red-pigmented granite chippings was superimposed on the wearing surface.

The contractors used a Barber-Greene finisher for laying the base coat and the wearing surface.

Concrete-Forming System

A catalog on Uni-Forms, a concrete-forming system, has been released by the Universal Form Clamp Co., 1238 N. Kostner Ave., Chicago 51, Ill. This system, the booklet explains, may be rented, bought, or rented with a purchase option.

Uni-Forms are made with a steel frame supporting a plywood facing and are designed for all types of concrete forming. A tie loop and a tie key are said to permit rapid erection and stripping. Photographs illustrate the component parts of the system and assembled units in the field.

This literature may be obtained from the company, or use the Request Card at page 16. Circle No. 142.

Under-Body Road Planers

A bulletin on road planers for maintaining dirt and gravel roads is available from the Pneu-Hydro Road Machinery Co., Manufacturing Division of General Sales Co., Cadillac, Mich. It stresses the Pneu-Hydro's positive controls mounted on the dashboard of the truck, which permit the driver-operator to direct blade movements while hauling materials, tools, or crew members in the truck.

The unit, mounted under the body of a truck on a fixed horizontal plane, makes a path for the rear wheels. The driver knows the angle of cut by the tilt of the truck, as he drives the crown of the road, and he has control over the depth by regulating the pressure applied to the blade.

This literature is available from the company, or by using the Request Card at page 16. Circle No. 41.

New Gradall Sales Mgr.

S. F. Beatty, Jr., formerly Assistant Sales Manager of The Warner & Swasey Co., Cleveland, Ohio, has been named Sales Manager of the Gradall Division. For a number of years he was associated with the Austin-Western Road Machinery Co. in sales and distribution. During the war he was Assistant Manager of the Consairway Division of Consolidated Vultee.

Seaco hard-surfacing prolongs the life and reduces cost of parts subject to severe impact and abrasion! Repairs made with Manganal and protected with Seaco, outlast new parts! A Seaco surface allows Manganese steel to work-harden before wear hits it. Never softened by dilution from parent metal. Brinell hardness 500-600. Available in 3/16" and 1/4" diameters. 12-inch lengths.

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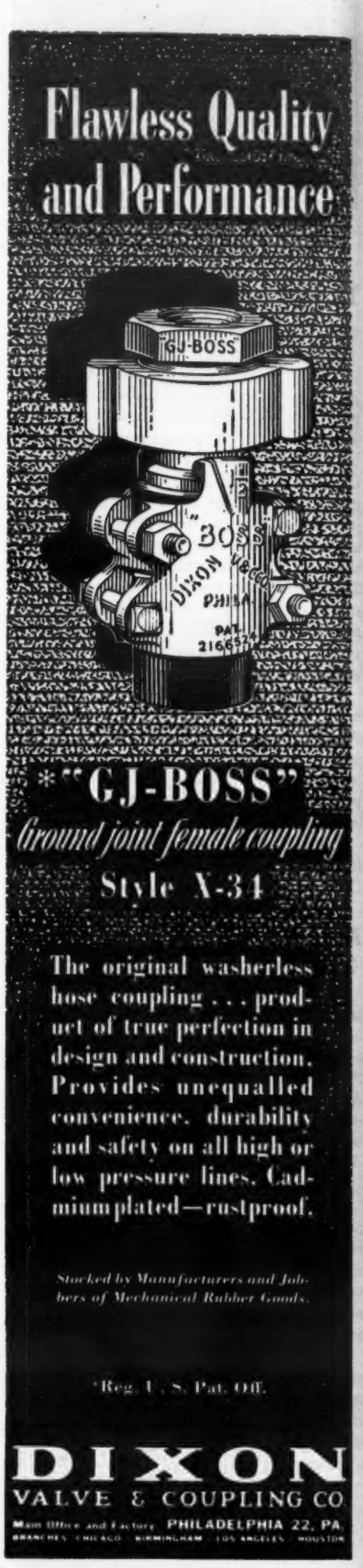
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The original washerless hose coupling . . . product of true perfection in design and construction. Provides unequalled convenience, durability and safety on all high or low pressure lines. Cadmium-plated—rustproof.
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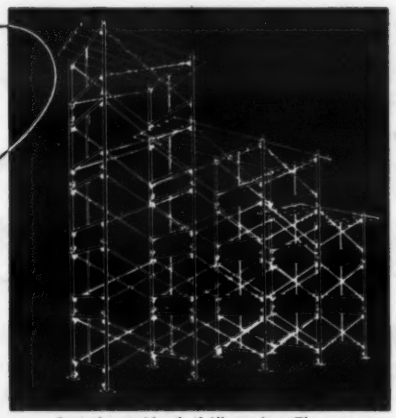

Typical assembly of 4' 6" panels on 7' spans

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SELLING USED EQUIPMENT?

See pages 98 and 99 *Advertise it in the* "TRADING POST"

Water Tunnel Driven Through Solid Rock

(*Continued from page 3*)

about 5.4 miles of tunnel to the diameters already mentioned, and lining with concrete the tunnel sections excavated under this contract, and also the spurs bored in previous contracts. It also includes the sinking of the 220-foot shaft No. 7B at the east end of the job in Boston, together with all other work incidental to the completion of the shafts and tunnel, such as pipe-line connections, etc. The job is located in the cities of Newton and Boston, and in the towns of Weston and Brookline.

Working from the bottom of shaft No. 7, the contractor completed the 10-foot-inside-diameter tunnel, 3,534 feet long, to shaft No. 7B during the latter part of 1948. For a 10-foot-ID tunnel the bore is 13½ feet to the pay line. No driving of the main tunnel was done from shaft No. 5 during 1948, but headings were driven both ways from the bottom of shaft No. 6 in the direction of shafts No. 5 and No. 7. For the 12-foot finished inside diameter of the main tunnel, a bore was made with a pay-line diameter of 15½ feet, and a minimum of 14 feet 2 inches was permitted. The heading excavation was followed by painting a circle with a 7-foot 1-inch radius on the heading rock to indicate projections remaining to be excavated.

Rock Tunnel

Excavation for the tunnel was entirely through solid rock which totaled 200,000 cubic yards. It was mostly conglomerate and arkose, very hard and solid, with only an occasional fault. When a fault did show up, it was only a narrow rift that occurred at a change in the rock texture and caused no safety hazard. As testimony of the hardness of the rock, only 16 linear feet of roof support were required on the tunnel driven to date. The break in the rock at a blast followed the paint line closely with very little overhead. For every cubic yard of rock that was excavated, 6 pounds of Hercules Gelamite 1-X dynamite was used.

Driving of the main tunnel was carried on from three headings, two working from the bottom of shaft No. 6 in opposite directions towards shafts No. 5 and No. 7, and the other heading from the bottom of shaft No. 7 towards shaft No. 6. Each heading operated as an individual unit, with separate crews for the drilling and mucking in the respective headings. Either of the operations could be carried on in all three headings at the same time; three 8-hour shifts were worked in each heading six days a week.

The greatest activity was at shaft No. 6 where the two headings were advanced from the common shaft. Here also the contractor set up his construction plant just off Commonwealth Avenue in Newton, on land belonging to the Newton Cemetery Corp. Muck from the tunnel is used to fill in some swampy areas on the cemetery property. The grass and topsoil were first removed from these low places and stockpiled. Rock taken from the tunnel at shaft No. 6 was segregated into two gradations—4 inches and over, and rock under 4 inches in size. The coarser rock was spread first in order to get better drainage, while the top 4½-foot layer consisted of the finer rock. Eventually the top course will be covered with 6 inches of topsoil and grass. At present this filled-in area will be used only for access to the cemetery proper, but it is graded so that in the future it may also accommodate graves.

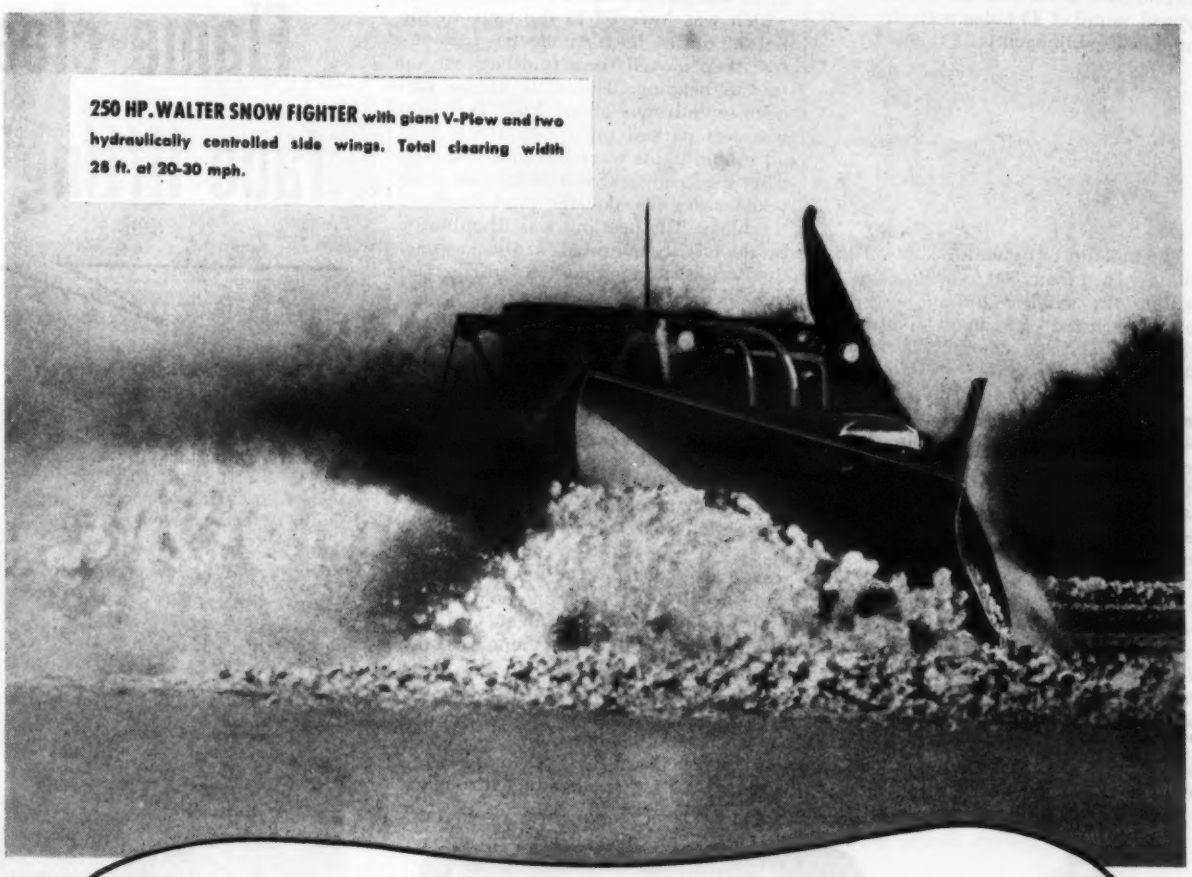
Drilling

Drilling was done from a jumbo 30 feet long operating on a 36-inch-gage track laid throughout the tunnel. It was made with 3 and 4-inch-diameter metal pipe tubing supporting collapsible working platforms on which were mounted seven Ingersoll-Rand D-505, 4-inch-bore, water-line drifter drills.

(*Continued on next page*)

Metropolitan District Commission Photo

The pump chamber at the bottom of shaft No. 6 in the City Tunnel.


250 HP. WALTER SNOW FIGHTER with giant V-Plow and two hydraulically controlled side wings. Total clearing width 28 ft. at 20-30 mph.

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A light-weight, portable, electric motor-driven Concrete Surfacer consisting of the Model R-2 Right Angle Head and Model AS Motor Unit.
Ideal for surfacing concrete construction and other applications.
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Water Tunnel Driven Through Solid Rock

(*Continued from preceding page*)

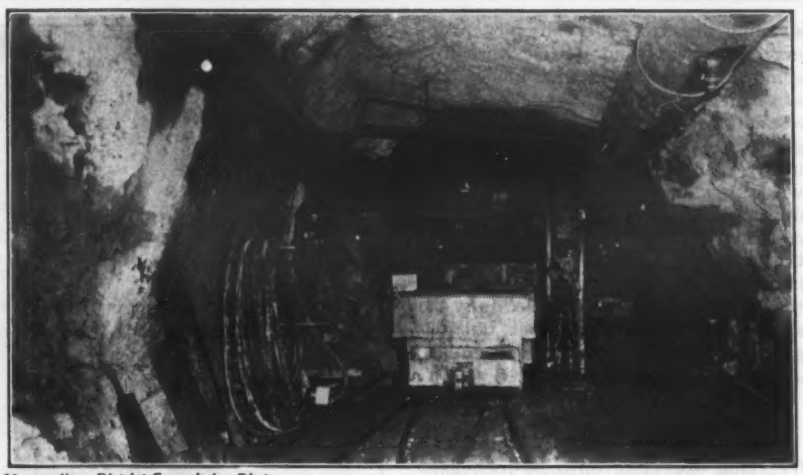
Two drifters were mounted near the bottom of the jumbo, two more about half-way up, two more at the top, with the seventh drifter on the middle platform at the center. They were easily shifted about on the columns to cover the entire drilling pattern. Round drill steel, 1¼-inch diameter, was used in the drifters, starting with 44-inch lengths and increasing by 30-inch increments up to a maximum length of 12 feet. Most of the holes were drilled to an average depth of 10 feet. This resulted in an average advance of 8 to 9 feet at a time over the full face after a blast.

Up to eight delays were used in the blasting, in a pattern devised to pull out the center core first with the instantaneous or No. 1 delay. The length of the delays increased from the center of the face outwards, with the longer delays placed in the outside holes around the perimeter of the face. A typical round of 43 holes with the delay number used in each is as follows.

Delay Number	Number of Holes
0	4
1	4
2	2
3	5
4	8
5	8
6	6
7	4
8	2
Total	43

The amount of dynamite shot off in a round varied from 300 to 500 pounds. In drilling the smaller tunnel, a typical round consisted of from 30 to 40 holes, while the average charge was around 200 pounds of dynamite.

In the beginning of the job, standard detachable bits from 2¼-inch down to 2-inch in size were used in the drifter drills. These had to be changed so often in the hard rock that Ingersoll-Rand Carset carboloy bits were brought in to replace them. A careful check was kept on the progress of these bits at the drilling from both shafts. After 300,000 linear feet of holes had been drilled from shaft No. 6, it was computed that each bit lasted for 210 linear feet. Working out from shaft No. 7 the rock was somewhat harder, and the average per bit there was 167 linear feet before it had to be replaced. This figure was the average over 200,000 linear feet of drilling.



Metropolitan District Commission Photo

An electric locomotive pushes an emptied muck car off the hoist cage in shaft No. 6.

Blasting

Well back from the shaft opening at ground level were the cap and dynamite houses enclosed by safety revetments. In preparation for a blast, the caps and powder were loaded into separate compartments in a magazine car which was lowered in the cage to the bottom of the shaft. An electric locomotive then moved the explosives car up to the heading. The drill jumbo had been withdrawn about 1,000 feet and was left parked on a side track. and all tunnel lights were likewise removed from the heading. Even flashlights were taken from the powder men charging the holes. The heading was illuminated by floodlights mounted on the locomotive, with storage batteries furnishing the electric current.

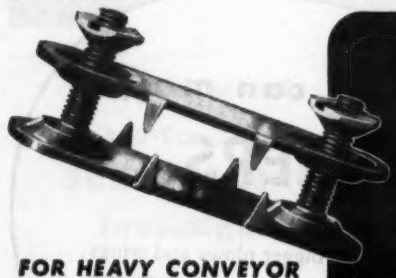
The power line for firing the charge ran along the tunnel wall on the same side as the light line to a point 1,500 feet from the heading. Then the firing line terminated, to continue up to the heading on the opposite side of the tunnel. This break in the firing line was equipped with two safety switches which had to be closed with a jumper connection before the blast could be made. All the workers moved back at least 1,500 feet from the heading before a blast, with the drill jumbo and mucking machine between them and the tunnel face. Not until then was the jumper connection closed in the firing line, and the switch thrown for the blast.

Right after the blast, the gases and foul air of the dynamite fumes were withdrawn from the heading through a 24-inch steel ventilating line which ran along one side of the tunnel up to within about 200 feet of the heading. A deflector at the end of the pipe protected it from flying rock. This ventilating pipe is connected at the top of the shaft to a Root blower, Size 7½ of the positive-impeller type, operated by a Westinghouse 45-hp motor off a 2,200-volt line. Each heading off shaft No. 6 has its own blower. For 20 minutes to half an hour after the blast, the blower worked in reverse as it exhausted the powder gases from the heading. When the air was clear, the sucking action was stopped, and the blower then blew fresh air from outside up to the tunnel heading as the miners resumed work.

Mucking

Before mucking began after a blast, any loose rock on the sides and roof of the tunnel was scaled down. With this hard rock, only a small amount of scaling was required before the mucking machine was moved up into position before the pile of blasted rock. Conway Type 75 mucking machines were used in each heading. They were powered by Hertner 75-hp induction motors off a 440-volt line. The job site was supplied

(*Continued on next page*)



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Flame cleaning speeds 'face lifting' on giant dam

MILLER CONTRACTING CO. OF OHIO, INC. located in Canton, a nationwide paint contractor, were engaged to repaint a hydroelectric dam in Virginia. The initial problem was to remove the 15-year old paint from 8 enormous crest gates. Ordinary methods would delay the job for weeks.

G. E. Hartwick, Airco Technical Sales Representative, suggested oxyacetylene flame cleaning with Series 9200 Torches and Airco Style 120 tips. Quickly and easily applied, the intense heat of the flame cockled the old paint, loosened scale and drove off surface moisture in a single operation.

The Miller Contracting Co. found that a flame cleaned surface made for a better finished paint job. An executive said, "We're convinced that flame cleaning is the most efficient and economical method of preparing steel surfaces prior to painting. We now use it almost exclusively for removing rust and scale."

• • • • •

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To assure its customers of high efficiency in all applications of the oxyacetylene flame or electric arc, Air Reduction has available the broad, practical experience of its nationwide Technical Sales Division personnel. The collective experience and knowledge of these specialists has helped thousands to a more effective use of Airco processes and products. Ask about this Airco "Plus-Value" service today. Write your nearest Airco office. In Texas: Magnolia Airco Gas Products Company . . . On West Coast: Air Reduction Pacific Company.

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with power at 13,200 volts which was stepped down to 2,400 volts by G-E transformers located on the surface. Down in the tunnel, Marcus transformers dropped this voltage still further to a 440 line for feeding the mucking machines.

The muckers operated on short sections of track which were laid ahead as the rock was gradually removed. Later during the drilling, these short pieces were replaced with the regular 30-foot rail lengths.

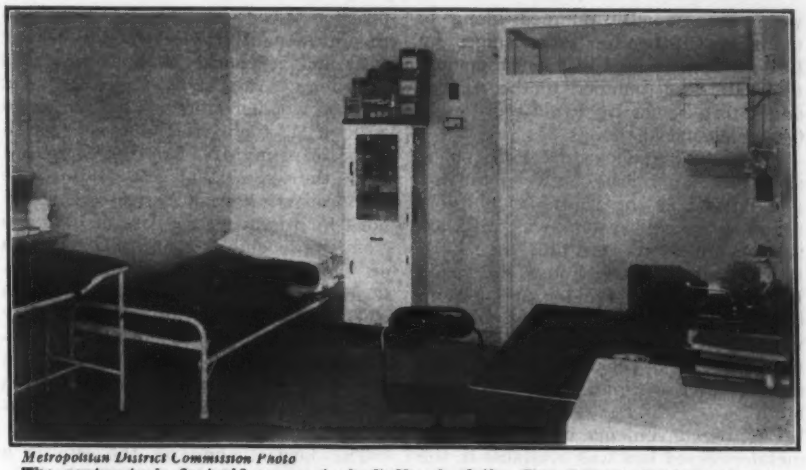
In order to eliminate car passers, cherry pickers, and the usual devices for maneuvering muck cars around one another so as to maintain a continuous mucking and loading operation, the contractors built a conveyor to work with each mucking machine. The rubber belt of the conveyor was 80 feet long x 42 inches wide, and was supported on two steel gantry frames that straddled the 36-inch-gage tracks and rode on their own 8-foot gage rails. The belt was driven by an electric motor. One end of the conveyor overhung the gantry and dropped down, like a boom, nearly to rail level right behind the mucker to which it was fastened. The mucking machine threw the rock back behind it onto this conveyor. The muck was then moved up the boom section to the long portion of the conveyor that was carried on top of the gantry frames.

Underneath was a train of muck cars that fitted in neatly within the conveyor framework. The muck spilled off the belt into the cars, one at a time, until all were loaded. In this way a five or six-car train was loaded in practically one operation. The empty train was moved up to the heading and taken away when loaded, without the need for any switching. This system was used in both headings opening off shaft No. 6. The heading off shaft No. 7 did not use a conveyor with the mucking machine, and the cars were loaded one at a time. A car passer was employed to get them by one another.

Muck Disposal

At the bottom of shaft No. 6 the tunnel was enlarged enough to lay a track that passed by one side of the shaft to connect the two headings. Sidings were also installed near the shaft to accommodate the loaded cars which were brought up the shaft on the cage, one car at a time. The steel muck cars were solidly built with their sides welded together, and held 4½ yards of material each. Up in the headframe above ground level the cars entered a rotary tipple where they were turned bottom side up to empty out the muck. The muck was discharged out over a grizzly made of sloping rails placed 4 inches apart. Thus the larger-size material went down a chute to one bin, while the 4-inch-and-under muck was chuted off to another compartment. Only 3½ minutes were needed to raise a loaded muck car from the tunnel, empty it, and return it to the tracks at the bottom of the shaft.

From the tipple the muck was hauled away in an end-dump Euclid and spoiled over the cemetery property. A Tournadozer leveled and graded the muck as it was dumped. From shaft No. 6 the average muck haul was only 600 feet. Muck from shaft No. 7 was disposed of in the unused Lawrence Basin of Chestnut Hill Reservoir, and from this location the average haul was somewhat less.



Metropolitan District Commission Photo
The contractor's first-aid room at shaft No. 6 of the City Tunnel Section of Kultman Aqueduct. Trained first-aid men were on the job 24 hours a day.

The cage at shaft No. 6 was raised by a Lambert mine hoist with a drum 10 feet long x 8 feet in diameter containing 635 feet of 1⅝-inch cable. It operated off a G-E 500-hp motor. The headframe was 60 feet high. A similar headframe and hoisting equipment was also in operation at shaft No. 7. At shafts No. 5 and 7B the headframes were only 40 feet high.

In the Tunnel

At the heading the average time between shots was 6 to 7 hours. The same crew which drilled the holes also looked after the mucking with the addition of a mucking-machine operator who came on when the heading was ready to be mucked. Progress reports showed that in a 24-hour work day an average of 25.7 feet of tunnel was driven in the west heading from shaft No. 6, and that 26.8 feet was the average daily production in the east heading.

The tunnel was well lighted with a pair of 100-watt bulbs strung along at 25-foot intervals, hooked to a 110-volt light line. Every switch in the maze of trackwork was marked by a red warning light. At the bottom of the shaft, where the tunnel widens out, the entire area was well illuminated

(Continued on next page)

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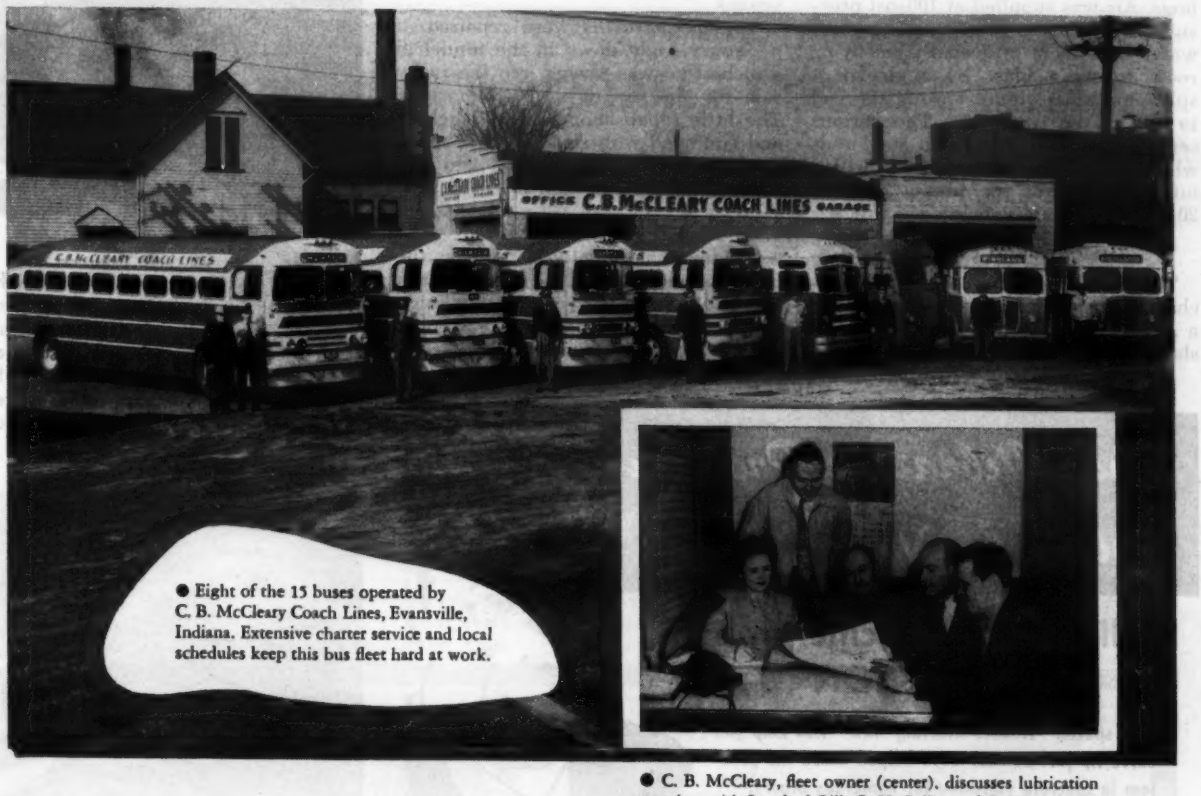

● Eight of the 15 buses operated by C. B. McCleary Coach Lines, Evansville, Indiana. Extensive charter service and local schedules keep this bus fleet hard at work.

● C. B. McCleary, fleet owner (center), discusses lubrication practices with Standard Oil's O. H. Collier and B. King (at the right). Gilbert McCleary and Agnes Funk, secretary, look on.

Puts charter fleet on the road to greater savings

Stanolube HD Motor Oil

CHARTER service takes the bus fleet of C. B. McCleary Coach Lines from Evansville, Indiana, to points throughout the nation and into Canada and Mexico Because all trips are scheduled with hotel reservations and eating arrangements made well in advance, it is important that road failures be kept at a minimum. For that reason, officials became concerned when engines required more and more upkeep because of excessive deposits and stuck rings.

The problem was put to a Standard Oil Automotive Engineer. The results obtained through the engineer's service and recommendations are reported by C. B. McCleary, owner: "Since using your Stanolube HD Motor Oil, our engine failures and maintenance costs have been substantially reduced. Engine parts are now clean and rings are free from carbon deposits. Your engineering service has been of much benefit to us."

Whether you have a particular lubrication problem or are simply looking for better fleet economy, you can benefit through this Standard Oil combination of expert engineering service and highest-quality Stanolube HD Motor Oil.

Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA) STANDARD

Water Tunnel Driven Through Solid Rock

(*Continued from preceding page*)

by fluorescent lighting.

Service lines into the tunnel, besides the ventilating pipe, electrical firing, and light lines, included a 2-inch water and a 6-inch compressed-air line for the operation of the water-line drifter drills. City water was used in the drills, while the air was supplied from a compressor house near the top of the shaft. At shaft No. 6, air for both headings was supplied from a single compressor house containing two Chicago Pneumatic stationary compressors with a total capacity of 3,500 cfm. One compressor was a 23 x 13 x 16 unit rated at 1,500 cfm, while the other was a 26 x 15 x 18 model rated at 2,000 cfm. Each compressor was powered by a G-E synchronous motor; a cooling system for the compressed air was immediately outside the house.

The 6-inch air line into the tunnel was not threaded at the joints, but was held together with roller-grip couplings. Air was supplied at 100-psi pressure. Up near the heading the air and water lines were protected from flying rock during a blast by a sleeve of split pipe with a blunt nose at the end to deflect the fragments. The various service lines were wired to steel rods which were inserted into holes drilled into the sides of the tunnel at from 20 to 25-foot intervals.

Underground Facilities

To drain the tunnel, an 8-inch discharge line ran from the heading out to a sump chamber at the bottom of the shaft. In these long tunnel sections the water was usually pumped along to the sump in two or three stages by LaBour booster pumps. From the sump the water was pumped to the surface and into a sewer by two Lecourtenay 6-inch electrical pumps.

A Teletalk public-address system is used to communicate between the top and bottom of the shaft. In addition, a job telephone system was installed with connections to the cage-hoist room, the compressor house, the heading, as well as to the top and bottom of the shaft. A stretcher and blanket was always held in readiness in the tunnel in case of accident, while trained first-aid men were on the job 24 hours a day.

For the convenience of the miners, a metal-covered box was available in the tunnel for storing the lunch pails in a dry place. Benches were placed along the walls at a widened section of the tunnel for use at lunch time, and refuse cans were at hand for the litter. A two-hole chemically-treated toilet was also available at the side of the tunnel; every day the waste was brought to the surface in cans and emptied into the sewers.

The drifter drills were repaired, if necessary, right down in the tunnel in a niche that was carved into the rocky side for the use of the drill doctors. The little repair shop was well lighted and equipped with small tools to make minor repairs, adjustments, and replacement of parts.

Contractor's Shops

Goodman locomotives pulled the muck trains through the tunnel. Each locomotive was powered by 54 Exide batteries which last for about 8 hours when used continually. The usual practice was to bring a locomotive to the surface after working an 8-hour shift and re-charge its batteries. This was done in the battery house, a 16 x 61-foot wooden frame shop, equipped with a 12-inch steel I-beam for a monorail running from the shop out over the entering track. Riding the monorail is an American 5-ton trolley hoist for removing the case of batteries from the locomotives and placing them on the floor of the shop. Three batteries were charged at a time on a Hertner motor-generator set until they reached a total capacity of 613 ampere-hours. If the battery was nearly run down, the required charging took from 10 to 12 hours, but the average battery was re-charged in 8 hours.

The largest shop on the site is a 41 x 80-foot Quonset hut which is divided into three fairly equal sections housing a blacksmith shop, a machine shop, and a warehouse. The latter is in the middle third of the hut and is used as a storeroom for small tools and parts. The entire hut has a concrete foundation floor and is lighted by overhead bulbs. The machine shop at one end is equipped with a 5-ton hoist, a Lincoln 300-amp electric welder, a Rockford drill press, a Toledo pipe threader, and a Peerless metal-cutting saw. Major equipment repairs were handled in the big shop of B. Perini & Sons, Inc., at Framingham, Mass.

In the blacksmith wing the drill steel was cut to desired lengths on an Ingersoll-Rand cutter, and the water-line holes were opened to the proper size. An I-R furnace and drill sharpener were also used for replacing the inserts in the drill bits, after which the steel was tempered in an oil bath. Two Black & Decker grinders, an 8-inch and a 10-inch, rounded out the shop equipment.

Quantities and Personnel

The tunnel driving will be completed this year, after which the tunnel will be lined with concrete from 8 to 13 inches thick. This will be done in three

(*Concluded on next page*)

2 TYPES OF ATHEY TRAILERS for every hauling job!

These heavy-duty trailers are mounted on Athey Forged-Trak Wheels, whose broad load-supporting tracks limit penetration into the ground and provide raised rails for easy rolling of the track wheels. The bodies of both of these trailers are constructed of high carbon steel to withstand the shock and abrasion of loading and dumping solid materials. All this means bigger payloads. Over rough, sharp rocks — over soft muck and mire — uphill or down — these trailers make their way surely and surely pay their way with continuous big-capacity performance.

2-WAY DUMP TRAILER

The shovel is loading an Athey 2-Way Dump Trailer — on a West Virginia job that involves moving 160,000 yards of rock. Length of haul: 600 feet; average load: 8 pay yards. The "Caterpillar" D8 Tractor handles this loaded trailer with ease, anywhere on the job.

SIDE DUMP QUARRY TRAILER

On a coal-stripping operation near Garden Ground, West Virginia, this Athey Side Dump Quarry Trailer hauls its capacity loads anywhere, in any weather, and dumps overburden clear over the edge of the bank.

Athey Products Corporation, Chicago 38, Illinois

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Depend upon your Athey-"Caterpillar" Dealer to specify the type and size of Athey Forged-Trak Trailer that fits your needs.

Athey FORGED-TRAK TRAILERS

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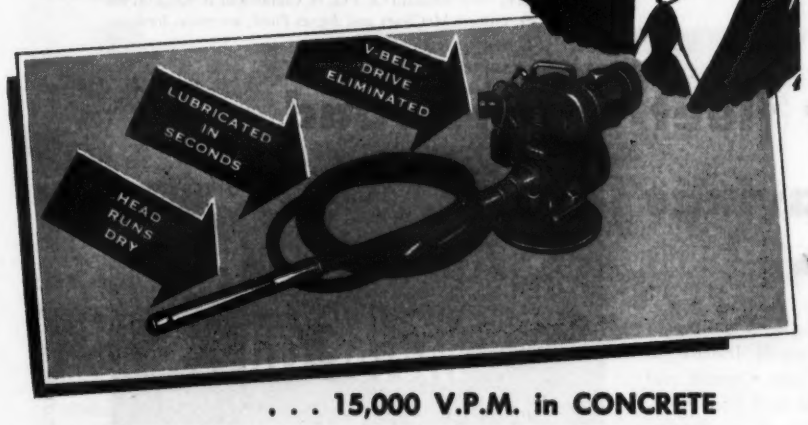
Tell us your specific problem in VIBRATION . . .

Our special "trouble-shooting staff" will help you solve it, just as they have helped solve the problem in concrete vibration for numerous others.



. . . 15,000 V.P.M. in CONCRETE with flexible shaft speed of only 3,600 R.P.M.

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different steps—curb, invert, and arch. From shaft No. 7 the aqueduct will connect to two existing pipe lines from which the water will be distributed to the mains. Lock Joint steel and concrete pipe, 48-inch diameter, will tie in to lines on Commonwealth Avenue and Beacon Street with 1,300 and 1,000 feet respectively of pipe.

The new aqueduct tunnel in Boston, which will supplement the old brick aqueducts that were not designed as pressure tunnels, will eliminate the antiquated system of pumps now in use at the Chestnut Hill Reservoir. It will also improve considerably the distribution of water in the metropolitan district which includes the main part of Boston.

The major items in the $9,529,867 contract include the following:

Excavation in tunnel	200,000 cu. yds.
Concrete in tunnel lining	90,000 cu. yds.
Portland cement	210,000 bbls.
Reinforcing steel	950,000 lbs.
Cast-iron pipe and fittings	300,000 lbs.
Steel-plate pipe and linings	1,000,000 lbs.
Steel castings	170,000 lbs.
Miscellaneous cast iron, wrought iron, and steel	80,000 lbs.

The four joint-venture contracting firms employed a force of 400 in the tunnel driving. The Perini, Maney, Walsh, and Rugo Construction Companies are represented on the project by J. R. Glaeser, Job Manager; Charles F. Kelley, Superintendent; and P. M. Putnam, Chief Engineer.

The Construction Division of the Metropolitan District Commission is headed by Karl R. Kennison, Chief Engineer. The Head Construction Engineer in charge of all field work is Frederick W. Gow, while J. J. Vertic is Resident Engineer on the City Tunnel construction.

New Diesel Engines

Two new models of closed-type power units, the DIX4B and DIX4D, have been added to the DIX4 Series of 4-cylinder diesel engines manufactured by the Hercules Motors Corp. of Canton, Ohio. The series are of the solid-injection compression-ignition 4-stroke-cycle type. They are designed for high-speed heavy-duty service.

The Model DIX4B has a 3¼-inch bore x 4-inch stroke with a piston displacement of 133 cubic inches. The Model DIX4D has a 3⅝-inch bore x 4-inch stroke and a piston displacement of 166 cubic inches.

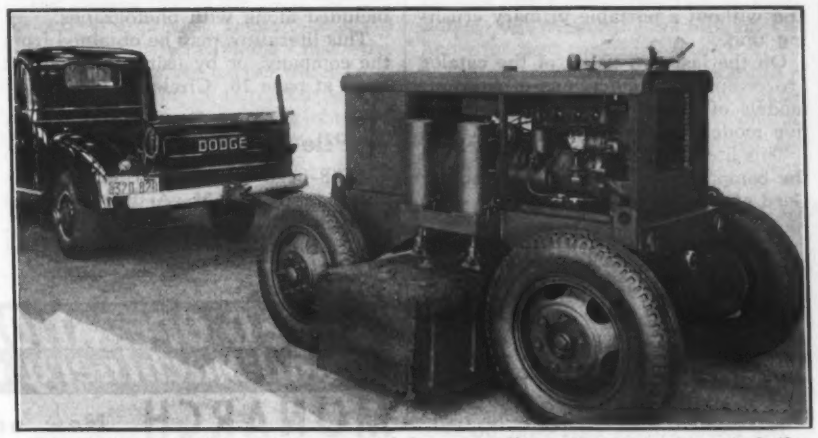
The Hercules line now consists of 15 series, 33 models, of gas and gasoline engines and power units in 2, 4, and 6 cylinders, with a power range from 3 to 240 hp; and a diesel line comprising 14 series, 30 models, in 2, 4, 6, and 8 cylinders with from 12 to 500 hp.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 73.

Magnetic Sweeper

A newly designed electro-magnetic sweeper has recently been developed and manufactured by International Diesel Electric Co., Inc., 13-02 44th Ave., Long Island City 1, N. Y. It is powered by a gasoline-engine generator set, and has a self-contained switchboard. Both magnet and generator are mounted on a 4-wheel trailer.

The unit is designed to sweep landing strips, roads, etc. clear of metal which might cause serious accidents or damage to planes or equipment. It consists of a 4-cylinder gasoline engine driving a 7½-kw direct-current generator, which furnishes the power to energize the magnetic pick-up unit. The magnet covers an area of 26 x 96 inches and is suspended by spring hangers to provide a rigid support under sudden acceleration or deceleration of the trailer.



This electro-magnetic sweeper, powered by a gasoline-engine generator set—both mounted on a 4-wheel trailer—is made by International Diesel Electric Co.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 131.

Transmission Gives Range of Gear Ratios

As special equipment for Ford trucks, a heavy-duty auxiliary transmission is made by Cook Bros. Equipment Co., 3330 San Fernando Road, Los Angeles 41, Calif. The Gear Splitter, as it is called, is designed to provide the best range of gear ratios to amplify and compound the regular truck transmission gears for heavy-duty hauling. Also available from Cook is a 20,000-pound-capacity all-steel double-reduction axle. The combination is designed to increase engine efficiency, economy, and speeds.

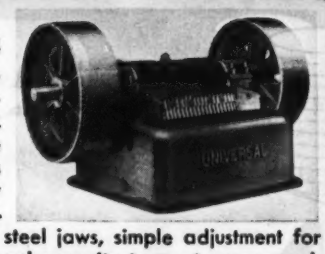
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 87.

Cement Salesman, Calif.

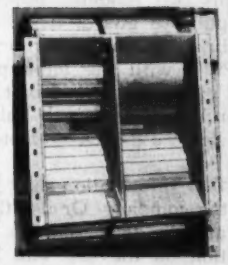
William D. Wadlington, of Chico, Calif., has been appointed sales representative for Calaveras Cement Co. in the north Sacramento Valley territory. He will maintain headquarters in Chico.

IN STATIONARY AND PORTABLE CRUSHING PLANTS
UNIVERSAL BASIC UNITS MEAN
MYPH AT LCPY
MORE YARDS PER HOUR AT LESS COST PER YARD

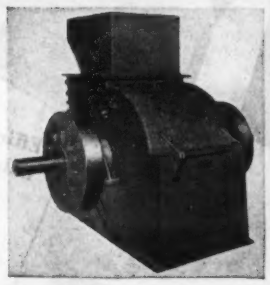
UNIVERSAL JAW CRUSHERS
With overhead eccentric principle originated by Universal. Force feed, force discharge. 4 types with plain or roller bearings. Tough reversible manganese steel jaws, simple adjustment for product size. A size and capacity to meet every need. Series "SL" Streamline illustrated. Bulletin 100B.



UNIVERSAL TWINDUAL ROLLS
Exclusive with Universal 293-Q Portable Quarry Plant, the Twin Dual Master Gravel Plants, and TwinDual Secondary Plants. Two stages of secondary reduction with one crusher. Permits up to 100% wider primary discharge opening. Amazing capacities and lower maintenance cost. Bulletins 31AA, 682A and U30S.

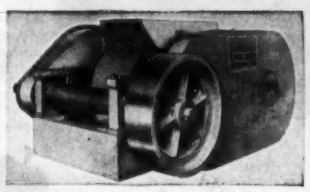


UNIVERSAL HAMMERMILLS
For profitable production of aglime and road rock up to 1½ inch. Roller bearing, welded steel plate construction. Manganese steel hammers and liners. Made in 4 sizes with capacities up to 100 tons per hour. Ask for bulletin 55B.



UNIVERSAL CONVEYORS
Sectional lattice or channel types. Rigid construction, easy to move—easy to set up. Anti-friction bearings throughout. Troughing rolls and return idlers are equipped with sealed-for-life bearings. Self-cleaning pulleys are provided where needed to protect belts. Available in multiples of 4′ lengths in 18, 24, 30, and 36 inch belt widths. Portable type has hydraulic hoist truck. Ask for Bulletin 46-7A.

UNIVERSAL DOUBLE ROLL SECONDARY CRUSHERS
Star gear final drive. Roller bearings, manganese steel roll shells. These crushers feature simplicity of design, greater capacity, double safety against tramp material, easy adjustment for product size, and strength for the toughest jobs. Built in sizes to meet every secondary crushing requirement. Bulletin 6B.



UNIVERSAL TROUGHING ROLLS
Made of heavy seamless steel tubing with end sections rolled in place. Self-aligning shaft locked in position. Mounted on a combination welded and pressed steel base and brackets. Anti-friction sealed-for-life bearings. A complete line of conveyor parts for new construction or repairs. Details in Bulletin 46-7A.

Other Basic Units available include: GYRATING AND REVOLVING SCREENS, ROTOVATOR, SCRUBBERS, SAND SCREWS, LOG WASHERS, STEEL BINS AND APRON FEEDERS

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MOUNTED ON WHEELBARROW CHASSIS
Write for details and prices
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1737 Farragut Ave. Chicago 40, Ill.

The BW740 band saw has a capacity of 12 inches from blade to frame and 7 inches maximum from guide to table.

Band Saw, 12-Inch; And 6-Inch Jointer

A new-model 12-inch band saw, BW740, has been placed in production by the Walker-Turner Division, Kearney & Trecker Corp., of Plainfield, N.J. The saw's capacity is 12 inches from blade to frame and 7 inches maximum from guide to table. Frame and body are a three-piece cast-iron design.

The saw has complete guarding. Guides have split-leaf blocks set at 45 degrees to secure maximum support close to the work with a low friction loss. Rip fence, miter gage, stand, motors, and other attachments can be furnished.

A new 6-inch jointer has also recently been placed in production. It is available in two models: the P912, with dual-purpose guard, triple belt drive, and direct-mount motor bracket; and the P911, with the flat-type conventional guard and single belt drive. The jointer has three 6-inch knives with a solid-steel 2½-inch-diameter cutterhead.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 95 for information on the saw and No. 96 for information on the jointer.

LeTourneau Reorganizes Its Service Department

Reorganization of the R. G. LeTourneau, Inc., Service Department into eastern, central, and western territories has been announced by the company. This new set-up aligns the functions of this department with those of the sales organization.

Cloyd W. Richards heads the department as General Service Manager. Pat Edwards, George Crafton, and Jack Lewis are, respectively, Eastern, Central, and Western Service Managers. The headquarters for all of them are at the home office of LeTourneau in Peoria, Ill. Clyde E. Clair has been named Special Service Representative, with headquarters in Peoria, to handle special service assignments.

Portable Gravel Plants

An 8-page catalog on Diamond standard portable rotor-lift gravel plants has been released by Diamond Iron Works, Inc., 1820 N. Second St., Minneapolis 11, Minn. This equipment bulletin, D-48-G, describes the company's line of portable plants for on-the-job aggregate production.

The folder tells what to consider in selecting a crushing and screening plant, and lists four Diamond models available; No. 95 with an approximate capacity of 160 cubic yards per hour, No. 66 for 110 cyh, No. 36 for 60 cyh, and No. 20R for 20 cyh. Photographs and text give details of construction. Two color drawings demonstrate the process of screening and crushing, with and without a portable primary crushing unit.

On the last two pages of the catalog are complete specifications of the four models of the rotor-lift plant and the five models of the primary plant.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 23.

Clamshell-Bucket Catalog

A new catalog covering the company's complete line of clamshell buckets is available from George Haiss Mfg. Co., Inc., Division of Pettibone Mulliken Corp., 141st to 144th St. on Park Ave., New York 51, N. Y.

The folder covers Hi-Power buckets for excavating, multi-sheave buckets for rehandling, and some special-purpose buckets. There are 13 models of the excavating buckets, ranging from ¼ to 2-cubic-yard capacity, and an equal number of rehandling buckets with capacities of ⅜ to 3 cubic yards. Complete specifications and dimensions are included along with photographs.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 42.

Pile-Construction Data

An 8-page folder describes pile installation by the MacArthur Concrete Pile Corp., 18 E. 48th St., New York 17, N. Y. It highlights the background and services of the corporation and the variety of piles installed. It explains the use of different piles for different soil conditions. And it illustrates fully the methods of forming the MacArthur compressed straight-shaft pile, compressed pedestal pile, permanent cased pile, and composite pile.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 91.

SPEED OPERATION for Snow Plows and Road Machinery with the . . . .

MONARCH New and Improved HY-LO-JACK

Fan Belt Driven

Power Hydraulic Control

Lifts plows ten times faster than hand pump. Cab-controlled. Easy installation on new or existing equipment. Priced for the most conservative budget.

WRITE FOR CIRCULAR H-75

MONARCH ROAD MACHINERY COMPANY, 327-329 Front Ave., N. W., Grand Rapids 4, Michigan

ACE-HIGH EQUIPMENT

A 7 cu. ft. ditching bucket.
Yaun's Ditching Bucket, built to your size requirements.
Efficient motorless tailgate spreader.
Yaun's World famous Dragline Bucket, available up to 30 cu. yards.

The finest engineering science and only the top in quality materials go into the manufacture of YAUN equipment. Every piece of YAUN equipment is backed by a reputation of value and service. Complete information can be obtained from your YAUN dealer, or direct from the factory.

YAUN DRAGLINE BUCKETS AND MFG. PLANT

BATON ROUGE, LA.

Write for folder

Convention Calendar

Sept. 25—Oct. 2—Construction Exposition

Construction Industries Exposition, Houston Chapter, Associated General Contractors of America, Inc., Sam Houston Coliseum, Houston, Texas. L. W. Duddlesten, General Manager, or Russell W. Nix, Chairman, Exposition Committee, AGC Office Bldg., Gray and Crawford Sts., Houston, Texas.

October 3-5—Lubrication Meeting

Annual meeting, National Lubricating Grease Institute, Hotel Roosevelt, New Orleans, La. Harry Bennetts, Executive Secretary, 4638 Mill Creek Parkway, Kansas City 2, Mo.

October 10-14—AASHO Meeting

Annual meeting, American Association of State Highway Officials, Gunter Hotel, San Antonio, Texas. Hal H. Hale, Executive Secretary, 1220 National Press Bldg., Washington 4, D. C.

October 10-14—ASTM Meeting

West-coast meeting, American Society for Testing Materials, Fairmont Hotel, San Francisco, Calif. C. L. Warwick, Executive Secretary, 1916 Race St., Philadelphia 3, Pa.

October 20-21—Virginia Highway Conference

Annual meeting, Virginia Highway Conference, Virginia Military Institute, Lexington, Va. R. P. Ellison, Executive Assistant, Virginia Department of Highways, 1221 E. Broad St., Richmond 19, Va.

October 24-28—National Safety Congress

National Safety Congress and Exposition, National Safety Council, Stevens, Congress, Morrison, and Sherman Hotels, Chicago, Ill. R. L. Forney, General Secretary, National Safety Council, 20 N. Wacker Drive, Chicago 6, Ill.

November 2-5—ASCE Meeting

Fall meeting, American Society of Civil Engineers, Hotel Statler, Washington, D. C. Don P. Reynolds, Assistant to the Secretary, 33 W. 39th St., New York 18, N. Y.

Earth-Boring Machine

Bulletin No. 746 on the Williams hole digger has been issued by Joslyn Mfg. & Supply Co., 20 N. Wacker Drive, Chicago, Ill. Specifications, photographs, and a drawing of general dimensions are included.

The drill requires a minimum of a 1½-ton dual-wheel truck for mounting. Powered by a Waukesha, Continental, or Allis-Chalmers engine, it will work earth, hardpan, gravel, shale, and soft laminated rocks. The operations of drilling, removing, and throw-off of borings are controlled by two levers.

The folder also mentions that truck beds, under-reamers, drilling bits, and leveling devices may be secured as accessory equipment.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 82.

Vacuum Concrete Process

Information on vacuum-concrete construction, in the form of folders, catalogs, and reprinted articles, is available from Vacuum Concrete, Inc., 4210 Sansom St., Philadelphia, Pa.

The catalog covers the basic vacuum process and precast vacuum-concrete construction. It explains that the vacuuming removes excess water from the concrete after it is placed so that a "no-slump" consistency is obtained rapidly. It outlines and pictures the process and summarizes test data obtained by comparing processed and non-processed concrete.

The other folders describe the use of the vacuum process for buildings, dams, retaining walls, and reinforced-concrete pipe. They emphasize the speed and economy of the method. Although the contractor's own men operate the equipment for this process, it is rented and not sold.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 64.

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A PRODUCT OF
CF&I
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In scores of industries, users of Wickwire Rope have developed an affectionate respect for its performance, safety and long life. And, for true economy, they use Wickwire's WISSCOLAY® Preformed. It lasts longer—is easier to cut, splice and install. It's kink-resistant and safer to handle. Wickwire Distributors and Rope Engineers, in key cities everywhere, are prepared to render prompt service in meeting your wire rope needs. Wickwire Rope Sales Office and Plant —Palmer, Massachusetts.
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IN THE EAST—Wickwire Spencer Steel Div. of C. F. & I., 500 Fifth Ave., New York 18, N.Y. • IN THE ROCKIES—The Colorado Fuel and Iron Corp., Continental Oil Bldg., Denver 2, Colo.
ON THE WEST COAST—The California Wire Cloth Corp., 1080—19th Ave., Oakland 6, Cal.

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47 Beaver St., New York 4, N.Y.

1. County engineers check depth of pulverized material behind a Wood P-600 Preparizer.

2. Next, a Wood windrow proportioner shapes road-mix mineral.

Road-Mixing Machines Shown for County Men

Demonstration Highlights Meeting Of California County Supervisors And County Engineers; 300 Attend

By RAYMOND P. DAY,
Western Editor

✦ COUNTY supervisors and engineers, perhaps more than any other group, are concerned with low-cost methods and equipment for dustless paved roads. As an expression of that concern and interest, nearly 100 per cent of the estimated 300 delegates turned out to Hoberg's Airport, in Lake County, Calif., to witness the demonstration of modern low-cost paving shown in the pictures on this page.

The occasion for the record turnout was the 39th Annual State Meeting of the County Supervisors Association of California, with the joint 30th Annual Meeting of the County Engineers Association of California. Headquartered at Hoberg's Resort and Seigler Springs, near placid Clear Lake, the combined program of business, equipment demonstration, and entertainment required three days, from June 29 to July 1.

County Roads Vital

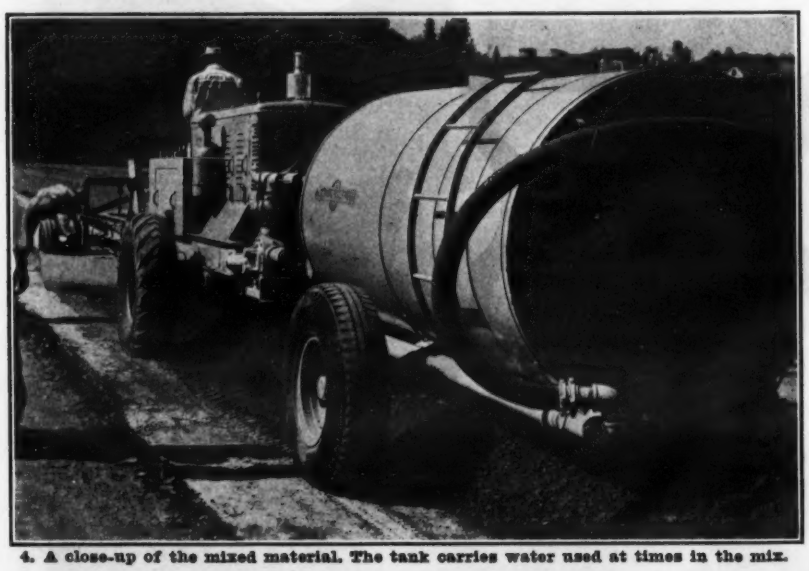
C. W. Phillips of the Public Roads Administration, formerly Chief Engineer of the Tennessee Department of Highways and Public Works, developed this theme as it applies to secondary and tertiary roads: that counties are subdivisions of the state.

Emphasizing one government and one transportation system, Phillips called on

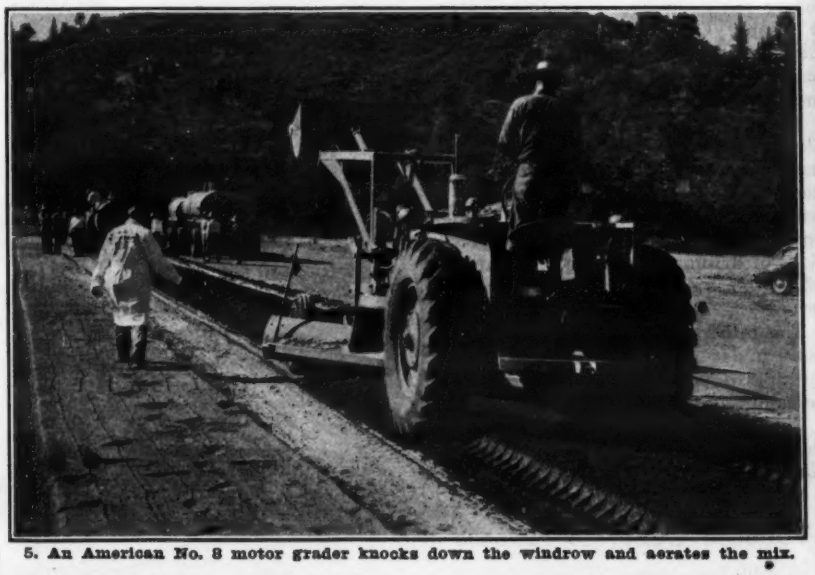
(*Concluded on next page*)

C. & E. M. Photos

3. Asphalt emulsion for the mix is delivered to a Wood Self-Propelled Roadmixer.



4. A close-up of the mixed material. The tank carries water used at times in the mix.



5. An American No. 8 motor grader knocks down the windrow and aerates the mix.

6. A Model C Tournadozer at the demonstration grades and shapes a baseball diamond.

7. California beauties decorate a Hough Payloader also on display.

county engineers especially to work hard toward that goal. County roads, he said, compare to the smaller nerves in the human nervous system, and while they do not carry the volume of messages the spinal cord does, they are nevertheless vital to the well-being of the individual.

How well that system is developed in California was shown when Phillips pointed out that 84 per cent of all rural dwellings were served by county roads in 1946, with improvement since then. Giving California's county engineers credit for this feat, Phillips called for more counties to establish competent engineering departments, staffed by trained men. Of 3,070 counties in the United States, less than one-third have competent engineering departments, he said.

Deploring pressure groups which do unsound things, Phillips said the most dangerous trend of all is the tendency to overthrow factual engineering findings. If the pressure long continues, he said, secondary highways may soon be extended beyond the financing or maintenance ability of the people they serve.

When Phillips called for better construction on secondary roads, with a view toward eliminating much maintenance, delegates had the answer ready-made shortly after the conclusion of his speech. Machines, men, and materials were assembled on Hoberg's Airport nearby. How they demolished the old surface, prepared the sub-base, and road-mixed new pavement with asphalt emulsion is shown in the picture on the opposite page.

Demonstration

As the first construction step, a Wood P-600 Preparizer, drawn by a Caterpillar tractor, pulverized the old ¾-inch oil mat and native granular base to a total depth of 5 inches, all in one pass. Picture No. 1 shows county engineers checking the pulverized depth.

After the pulverized material had been bladed roughly by a motor grader, a Wood windrow proportioner (Photo No. 2) moved up on the line. This machine shaped the road-mix mineral so it would pick up and move through the next machine with maximum efficiency.

All the delegates seemed especially interested in the mixing operation that followed. Picture No. 3 shows the machines: a Wood Self-Propelled Roadmixer at the right, and a Kenworth truck with trailer for delivery of the emulsion, which was furnished by Stancal Asphalt Bitumuls Co. of Los Angeles through Sheldon Oil Co. of Suisun.

The asphalt emulsion, known as L3RM Stancal Emulsion, was used at a volumetric ratio of approximately 6 per cent. It was hauled to Hoberg's Airport from Suisun. The 5,000-gallon load necessary for this demonstration was easily handled in the 2,500-gallon truck tank and the 3,400-gallon trailer. A flexible hose carried emulsion from the tanker to the machine.

The Wood Self-Propelled Roadmixer, rated at a handling capacity of 4 cubic feet per linear foot of windrow, handled the 3.25-cubic-foot sub-base mound quite easily. Moving forward at an average rate of 21 fpm, the machine mixed the granular material with emulsion, turning it out behind in an unbroken black stream.

Picture No. 4 shows an especially fine close-up of the mixed material turned out by the machine. This windrow when laid down made about 3 inches of pavement, a big improvement over the old thin-skinned airport. The tank shown in the picture carried water, used occasionally in the mix.

The next step was to knock down the windrow, aerate the mix, and get it ready to spread. Picture 5 shows an American No. 8 motor grader as it neatly cuts a segment of road-mixed material out to the side. The well-mixed nature of the soil and asphalt is vividly illustrated by the plastic tire marks left behind.

A Caterpillar No. 12 did most of the mixing prepatory to rolling. Rolling was done, about 24 hours after the mixing, by pneumatic tires on a semi-trailer which hauled the heavy equipment up from Los Angeles.

An area about 800 feet long x 55 feet wide was covered in the demonstration.

Leonard Pulley of the Wood Mfg. Co., acted as superintendent. The company was well represented by Roy and Wally Wood, Charley Erb, Herb and Leonard Pulley, Ray Early, Roger Coffelt, and Jack Crosby.

Other Units Shown

A baseball diamond was graded and shaped as part of the demonstration by LeTourneau scrapers and a Model C Tournadozer (Photo 6). And four beauteous maids from Vallejo, on vacation, (Photo 7) took over a Hough Payloader also on display.

Hoists and Dump Bodies

A catalog is available from the Marion Metal Products Co., Hoist and Body Division, Marion, Ohio, on its complete line of hydraulic hoists and dump bodies. This includes light, medium, and heavy-duty units, and special designs for a variety of services.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 135.

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CONTRACTORS BARROWS

are 100% water tight

There are many other features which make JACKMANCO barrows highly regarded for ruggedness and utility. You'll find a JACKMANCO barrow specially designed for the use you have in mind.

WHEELBARROWS
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OMAHA DRAGLINE BUCKETS

Tops 'em all

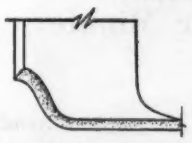
In PAYLOAD and PROFIT

Operators say it. Contractors show it. Records prove it! Omaha Buckets make every load a payload, every job a profitable one. The know-how of many contractors and engineers has been built into Omaha Buckets — surplus weight eliminated to give a greater total load; more sturdy design and construction for the tough digging jobs. For performance and profit on the job, Omaha Dragline Buckets Tops 'Em All!

PERFECT BALANCE

Perfect suspension — carries load evenly—no spilling.

CUTS LIKE A SPADE



Proper pitch and special hardening process holds its edge. Outwears and outdigs.

Write for complete catalog.

DRAKE-WILLIAMS-MOUNT • OMAHA, NEBR.

600% Longer Service Life

that's the operator's report on GATKE Type 300 Clutch Discs in the Swing Clutch of a Power Shovel

LARGE OR SMALL

Whatever the Service

GATKE BRAKE LININGS and CLUTCH FACINGS offer extra performance value that gets the job done — FASTER — and also effects important savings. Try them and see what you've been missing.

Just send dimensional prints and description of service condition for the Gatke recommendation.

Gatke CORPORATION 224 N. La Salle St. Chicago 1, Illinois

The Model PTO-60 tractor-powered air compressor has a piston displacement of 60 cfm, delivers a pressure of 80 to 125 psi, and weighs 620 pounds.

Two Air Compressors Are Tractor-Powered

Two new air compressors for direct attachment to tractor power-take-offs, through universal joint couplings, are announced by Miller-Robinson Co., 7007 Avalon Blvd., Los Angeles, Calif. The new units are identified as Models 60 and 80; they have displacements of 60 and 80 cfm, respectively.

PTO compressors can be attached to the regular linkage of Ford and Ferguson tractors and hydraulically equipped Jeeps, and are adapted to other makes of tractors by the use of brackets. Relatively light and portable, these units, the company says, may be used in place of larger engine-driven compressors to provide air for commonly used tools such as jackhammers, pavement breakers, clay diggers, etc.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 93.

Rubber-Products Catalog

A 16-page catalog and several folders on rubber products for the construction field are available from the Quaker Rubber Corp., 4641 Comly St., Philadelphia 24, Pa. They describe, list sizes, and illustrate some of the company's 9,000 industrial rubber products, including belting, hose for all types of service, gaskets, and miscellaneous fittings.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 49.

AASHO Annual Meeting

The 35th annual meeting of the American Association of State Highway Officials will be held in the Gunter Hotel in San Antonio, Texas, October 10-14.

The tentative program calls for registration and a general session starting at 9 a.m. Monday morning, October 10. The general session will continue Monday afternoon and Tuesday morning and feature addresses by members of Congress and other guest speakers. It will also include 25-year awards of merit and awards to the national essay-contest winners, Prof. E. H. Karrer of Ohio State University, and Michael Lash, Jr., Tufts College.

Regular committee meetings will begin Tuesday afternoon and continue through Thursday morning. A business session will be held Thursday afternoon. Friday morning the special trip to Monterrey, Mexico, will begin.

Literature on Snow Plows

The Anderson Engineering Co., 229 Bent St., Cambridge 41, Mass., has recently issued new folders on its line of automatic-trip reversible and one-way plows, and on its V-type plows. Front and back views of the units, text descriptions, and specifications are given for all models.

The standard Model S is available with moldboards 8, 9, or 10-feet long, with either a 24 or 32-inch height. The Model X is a heavy-duty type with a moldboard up to 11 feet x 36 inches, and has 8 vertical ribs rather than the 6 on the standard model. Both models have the automatic unit-type tripping device. The Series T Anderson one-way plows have a carefully controlled curvature to permit high-speed work. They are available in three sizes.

The 35-degree V-plow, Model V875, is suitable for 1½ to 3-ton trucks, and is specially designed with high and broad moldboards to help snow over windrows when "pushing back".

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 12.

Catalog on Stud Driving

How steel studs can be driven into steel, masonry, or concrete with the M.S.A. Velocity-Power Driver is told in a new 4-page bulletin, No. TA-17, issued by the Mine Safety Appliances Co., Braddock, Thomas, and Meade Sts., Pittsburgh 8, Pa.

The catalog explains how the M.S.A. driver, which weighs less than 5 pounds, uses the energy of a blank cartridge to penetrate steel or concrete, making it unnecessary to drill or plug. To operate the driver, the cartridge assembly is inserted, the barrel is screwed into the firing unit, and the driver is placed over the work and fired. Driver barrels are available in two sizes, interchangeable with the firing unit.

The folder illustrates and describes in detail each part of the driver and its applications. Included on the back page is a table listing the types of studs which are to be used for specific jobs.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 94.

Accidents don't happen—they are caused. Remember, safety always pays.

Power-Shovel Catalog

A 4-page catalog on the Series 8 Model S-4 four-wheel-drive ½-yard excavator is available from Michigan Power Shovel Co., Miller and Second Sts., Benton Harbor, Mich. It gives complete specifications for crane, clamshell, dragline, shovel, and hoe uses. Dimensions, capacities, weights, speeds, etc. are included.

This literature on the Model S-4 excavator may be obtained from the company, or by using the Request Card at page 16. Circle No. 88.

West Coast Sales Mgr.

John P. McArthur has been made Manager of West Coast Sales for Worthington Pump & Machinery Corp., Harrison, N. J. He will have his headquarters in San Francisco, and will supervise the activities of the Los Angeles, San Francisco, Seattle, and Salt Lake City District Offices.

A SMOOTH OPERATOR IN A RUGGED BUSINESS

Miller Model B is the ideal trailer buy in the construction field. Model B frame is all steel and built of 12" deep channels braced from corner to corner with 3" channels. The axle is 16" deep, built of 4" tubing, 4" I beam and a 10" channel. Dual wheels (BUDD) tires & hubs, platform, Timken bearings and pintle hook are all standard equipment.

IMMEDIATE DELIVERY—$975.00
Optional equipment is extra and listed below. Hydraulic tilt control, two speed winch, Electric brakes.

The superior engineering and construction of this trailer make it the safest and most dependable trailer on the road.

RAY MILLER RESEARCH ENGINEERS
727 W. BURNHAM, DEPT. 399
MILWAUKEE 4, WISCONSIN

SCARIFIES...
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WOOD
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PREPARIZER
P-600

● Tears up old asphalt or macadam surfaces and pulverizes into select aggregate for low-cost reuse. Also prepares adobes, clays and other soils for mix-in-place construction. Tractor drawn...self-contained power plant for pulverizing...hydraulic jack depth control...pneumatic tires.

Roadbuilders save as much as $3000 per mile with a WOOD P-600 PREPARIZER. Write today for full details!

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Loads
3 to 5 Y.P.M.*

Soon Pays for Itself in Time and Money Saved!

- From job to job at truck speed.
- Handles ANY loose material quickly and economically—coal, snow, dirt, gravel, cinders, etc.
- One-man operation.

* Yards Per Minute

Send for Bulletin CE-491

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JAW CRUSHERS · IMPACT BREAKERS
PULVERIZERS · CONVEYORS · LOADERS
CRUSHER CO., Inc.
GALION OHIO·U·S·A

A 2½ or 3-hp gasoline engine powers this traffic-line marker—the new self-propelled Mark-Rite Line-Master.

Road-Striping Unit

A new self-propelled line marker is now made by the Universal Mfg. & Sales Co., 8716 Santa Fe Ave., South Gate, Calif. This new model, the Mark-Rite Line-Master, is powered by a 2½ or 3-hp 4-cycle air-cooled gasoline engine. The compressor unit is of the 2-cylinder single-stage type. The two-wheel V-belt drive is designed to assure continuous traction at all times.

The vertical paint container is equipped with a manual agitator which allows paint agitation as necessary. It is easy to remove for cleaning, the company says. A fitting equipped with a self-locking valve permits the Line-Master road striper to be used as a portable spray rig with a hand spray.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 90.

Electric Flare Set

Electric flares with either steady or flashing lights are available from the K-D Lamp Co., Dept. CEM, 1910 Elm St., Cincinnati 10, Ohio. These flares emit a clear red light which, the company says, can be seen for 1,000 feet or more.

The flare body is of a heavy metal construction. It is waterproof and has a red baked-enamel finish. A red Fresnel glass lens tops the flare. A finger-tip switch controls the current from a 6-volt battery. A new cartridge-type flasher, flashing 80 to 90 times per minute, combines motion and light, and has no mechanical parts to get out of order, the manufacturer states.

A sturdy metal box with a red baked-enamel finish holds three lanterns and has built-in storage space for spare batteries, bulbs, and flags.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 123.

Lathe-Converter Folders

Folders on Master lathe converters are now available from the Master Mfg. Co. of Hutchinson, Kans. These lathe converters are available in three models: Model C with a ⅓-hp motor for use on 9 to 13-inch swing lathes, Model B with a ½-hp motor (¾-hp optional) for use on lathes with a 14 through 18-inch swing, and Model M with a 1-hp motor (1½-hp optional) for use on heavy-duty lathes, 18 to 60-inch swing.

The folders illustrate a variety of operations that can be performed with the lathe converters. They also illustrate the component parts of the machine, as well as heads and accessories.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 146.

Houghton & Co. Raises Ross

Frank Ross, National Manager of Lubrication for E. F. Houghton & Co., manufacturer of industrial oils, chemicals, and leathers, has been appointed to the newly created post of Assistant to the Vice President of Sales. Mr. Ross will retain his duties and title as head of the Lubrication Department. He has transferred his headquarters from Cleveland to the home office in Philadelphia.

Curing Compound

A concrete-curing compound, R.I.W. Toxkure, is now made by Toch Brothers, Inc., 2600 Richmond Terrace, Staten Island, N.Y. It is described as a solution of synthetic resin and other agents combined to produce a weather-resistant elastic membrane without breaks or pinholes. When first applied it darkens the surface, but as the concrete hardens, Toxkure sets to a transparent flexible film.

The compound is applied immediately after the concrete has been placed and finished, using a pressure spray or a wide soft-bristle brush. It is spread on the basis of about 250 to 300 square feet to the gallon.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 144.

FASTER GRINDING . . . at the bench . . . on the job!

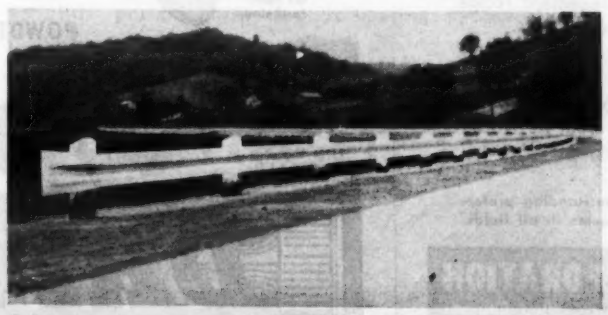
Buy Van Dorn Bench Grinders to bring the work to the tool. Buy Van Dorn Portable Grinders to bring the tool to the work. You save time either way with these powerful tools. You get better results in sharpening tools; grinding welds; removing rust, scale, old paint; cutting off old rivets, bolts and studs; and a host of other jobs! You get high-quality Van Dorn construction and design for *extra* years of finest service. See your nearby Van Dorn Distributor. Write for free catalog to: The Van Dorn Electric Tool Co., 787 Joppa Road, Towson 4, Maryland.

For Power Specify "Van Dorn" (DIV. OF BLACK & DECKER MFG. CO.) PORTABLE ELECTRIC TOOLS

Showing Safety-Beam installed on bridge over Pennsauken Creek, River Road, Palmyra, N. J. Contractor: Eugene F. Verga, Inc., Camden, N. J.

You Can Be Sure with Safety-Beam

First step in installing Safety-Beam. Driving Bethlehem steel posts along highway near Freemansburg, Pa. Contractor: L. S. Lee & Son, Harrisburg, Pa.



Safety-Beam Guard Rail protects motorists at this sharp turn on Route 7, Gallipolis, Ohio. Contractor: Harvey Candel, Bucyrus, Ohio.

You can be sure of constant, dependable protection for motorists when you install Bethlehem Safety-Beam Guard Rail at danger points along highways.

Bethlehem Safety-Beam Guard Rail is ideal for use at turns, embankments, bridge approaches and other hazardous locations because it consists of heavy sections of steel plate, bolted together on steel or wood posts to form a continuous, impact-absorbing beam. When a runaway vehicle strikes Safety-Beam, the impact is absorbed by several adjacent posts, making it virtually impossible for a moving vehicle to break through the rail.

Safety-Beam offers another important safety factor, for it is easily visible at all hours, either day or night. It can be mounted quickly, even by unskilled labor, for the rail fastens to the post with but one bolt. No end rods, anchor rods, special tools or complicated adjustments are required.

For complete information about Safety-Beam Guard Rail, drop a line to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

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STEEL FOR HIGHWAYS

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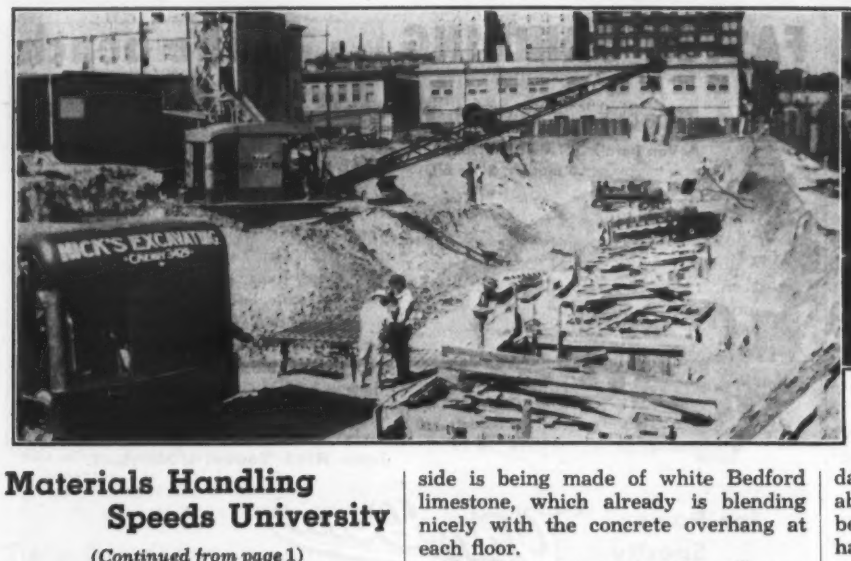
BETHLEHEM STEEL



Thomas Bate & Sons Photos
At left, a Bucyrus-Erie 22-B crane handles a 1-yard concrete bucket during a footing pour on the University of Denver classroom building. Above, two 1-yard buckets of concrete come in to the building foundation on a flatbed truck.

Materials Handling Speeds University

(Continued from page 1)

gether at the ends by two smaller buildings. The ultimate program will enlarge the university's capacity and take care of new students in business administration and law.

Designed by G. Meredith Musick and Smith, Hegner & Moore, Associated Architects, of Denver, the new building is ultramodern in all respects. A recent drive for funds which raised about $2,000,000 is paying for the new construction.

New Building Design

The new classroom is to be a 4-story fireproof structure measuring 309.75 x 61.25 feet. The structural skeleton of the building is made of steel, with all the I-beam girders and columns fireproofed with a minimum cover of 1½ inches of concrete. Reed clips will help the concrete stick to the steel skeleton.

One of the features of the large classrooms is the fact that all the interior partitions are metal and movable. This gives each floor a great deal of the flexibility it needs to prepare rooms for varying numbers of students. Walls and ceilings are to be finished with glazed acoustical tile.

The floors are reinforced-concrete, suspended and held by the structural girders. These concrete floors will be surfaced with terrazzo. Truscon steel sash gives the glaziers an easy time, and insures maximum utilization of natural sunlight.

From the outside the building will be modernistic and beautiful. The outside is being made of white Bedford limestone, which already is blending nicely with the concrete overhang at each floor.

The Bate contract includes all concrete work, foundations, plumbing, heating, electrical, and structural work to complete the building itself. As plans now stand, the contract calls for complete finishing only of the second and third floors. The first and fourth floors will be finished later. It is expected that the fourth floor may be a library, and provisions may even be made to use the rooftop as an outdoor study room. Construction men on the job take a dim view of this plan to further education, however, for the snow-capped Rockies all around Denver furnish beautiful scenery, and the fact that the university is a coeducational institution will furnish certain other distractions.

As is usually the case on building construction work, subcontracts were let for the specialty items. Denver Plumbing & Heating is installing the plumbing and the heating. The boiler will be fired by gas. Sturgeon Electric Co. has the electrical subcontract. Horn Crane Service subbed the foundation excavation and setting the structural steel. The structural steel was fabricated and furnished by Burkhart Steel Co. Fox Sheet Metal Co. and Johnson Temperature Control of Milwaukee were also represented.

Excavation Starts the Job

The job got under way officially on June 21, 1948, when Horn Crane Service moved in with excavating equipment; the scheduled completion date is January, 1950. To get down to a solid foundation, a block of excavation extending about 22 feet below street level had to be removed. This main excavation was handled by a Bucyrus-Erie 22-B shovel and a Lorain 40, loading into dump trucks. The best material was stockpiled for backfill, while the other material was sent to specified disposal areas.

Studies made after the foundation was exposed showed certain clay strata which had to be removed. The foundation design was changed somewhat, but the details were worked out with a

(Continued on next page)

Hanging Acoustical Ceilings
Painesville High School, Painesville, O.

DO IT with DRIVE-IT!

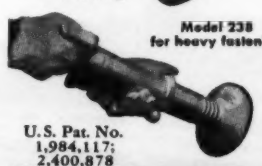
● A Drive-It tool . . . a small power charge . . . a drive-pin . . . that's the three-way formula for fast fastening which is saving thousands of dollars every day on construction jobs coast to coast.

If you're still wasting time and money by using old-fashioned "dig and drill" methods for fastening steel or wood to concrete or steel, better get the facts on DRIVE-IT, the modern "split-second" fastening system. It's safe, easy on your men and on *your pocketbook!*

A choice of tools and power loads for light or heavy work . . . plus a wide selection of drive-pins. There's sure to be one for *your* particular job!

Write us *now* for the facts on Drive-It and for the name of your nearest Drive-It distributor. He'll be glad to arrange a demonstration.

Model 222 for light fastening


Model 238 for heavy fastening

U.S. Pat. No. 1,984,117; 2,400,878

Distributors Coast-to-Coast
Canadian Distributor: AMMO-POWER TOOL CO., LTD., Ft. of McLean Drive, Vancouver, B. C.
POWDER POWER TOOL CORPORATION
0705 S. W. Woods St. Portland 1, Oregon

Here's the *Proof* of Preference for WISCONSIN HEAVY-DUTY *Air-Cooled* ENGINES

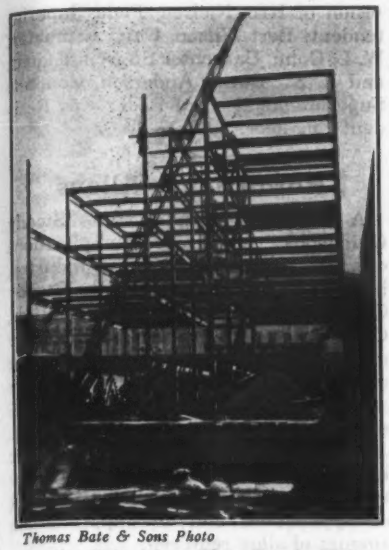
4 Out of 10 Carburetor Type Engines made in 1947 in 2 to 30 H.P. Range were WISCONSINS!

According to an official bulletin issued on April, 22, 1949 by The Bureau of Census, Dept. of Commerce (Preliminary Industry Report, Series MC-31D, covering the production of Internal Combustion Engines for the year 1947) 40.2% of all carburetor type engines within a cu. in. displacement range from 11.0 to 175.9 were Wisconsin Air-Cooled Engines.

The summary includes data received by the Census Bureau from 134 engine manufacturers. The tabulation of the 9 groups within the above displacement range, does not include automotive, aircraft, and outboard marine engines, built for resale as separate power units or engines for use as original equipment by manufacturers.

These figures speak for themselves . . . in terms of outstanding preference for Wisconsin Air-Cooled Engines among power users in all fields.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 14, WISCONSIN



Thomas Bate & Sons Photo

On the Bate job, a Thew-Lorain Moto-Crane erects a structural-steel skeleton as the first building operation after excavation.

fine spirit of cooperation between the architects and the contractor, and the work suffered but little.

The 12-inch I-beam columns rest on heavy reinforced-concrete footing pads, which were poured in place as soon as the foundation excavation was completed. Cranes, one with a 95-foot boom, then moved in and quickly set the structural steel. The building was finished structurally as the crane moved along, with all members in place for the four-story construction.

Materials Handling Simplified

By the time this work was done, much of the installation of materials-handling devices was either planned or started.

First of all, a tunnel was built about 50 feet long leading away from the building foundation. Its sides were cribbed with timber to prevent cave-ins. Inside the tunnel a weigh hopper was installed on a steel overhead track, so concrete materials could be weighed and sent to be mixed. A CMC 16-S Thoro-Mix concrete mixer was also set up inside the tunnel near the mouth. A wooden hoist tower, 90 feet high, was erected along the building at the tunnel mouth.

Over the tunnel, two storage pits, holding approximately 30 cubic yards were built flush with the natural ground level to receive sand and 1-inch concrete aggregate. A cement house was also built to receive and dispense Ideal sack cement. The hopper inside this shed had a steel knife for opening sacks, and a supply of Pozzolith which was used in the mix. One man was able to run this cement house. A chute from the hopper led down the tunnel wall, and by means of a lever could be pushed over to the concrete-mixer skip and dumped.

The hoisting equipment was also outside the tunnel. It was situated so the engineer could see as much as possible. The hoist was a 2-drum Jaeger, powered by a Commonwealth electric motor rated at 15 hp.

The cable from one drum of the hoist was rigged to raise a 1½-cubic-yard concrete bucket inside the wood tower. The second cable was used in a somewhat different way. It led up to the floor on which work was under way, and through a sheave to an outrigger jib on the west side of the building, meeting a steel monorail which was suspended there from the underside of the structural framework.

This part of the hoist paid off especially well, for it raised all kinds of building materials without trouble. A Yale 1½-ton chain hoist on the end of the monorail could easily hook on to a load and quickly make the transfer. Then the load of materials could be taken anywhere on the monorail and unloaded.

But the most versatile materials-handling rig was the jinniwick, designed, engineered, and named by Kris Nielsen, General Superintendent, and E. E. "Buck" Andersen, Concrete Superintendent for the Denver Branch of Thomas Bate & Sons. This same pair designed the monorail system of handling concrete.

The jinniwick consisted basically of a small rubber-tired shop-made crane, equipped with motorized power, a hoisting engine, and an A-frame.

Mechanical equipment for the jinniwick consisted of the driving engine from a Gar-Bro Power-Cart, disengaged from its concrete bucket and mounted on one end of the jinniwick. The coupling was arranged simply,

(Concluded on next page)

C. & E. M. Photo

Bedford stone building blocks are stacked outside the new classroom building until they are ready for use.

Vulcan Tools

A complete line for every type of Rock Drill, Pavement Breaker and Clay Digger.

Vulcan Tool Manufacturing Co.

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Branch Offices and Warehouse Stocks.

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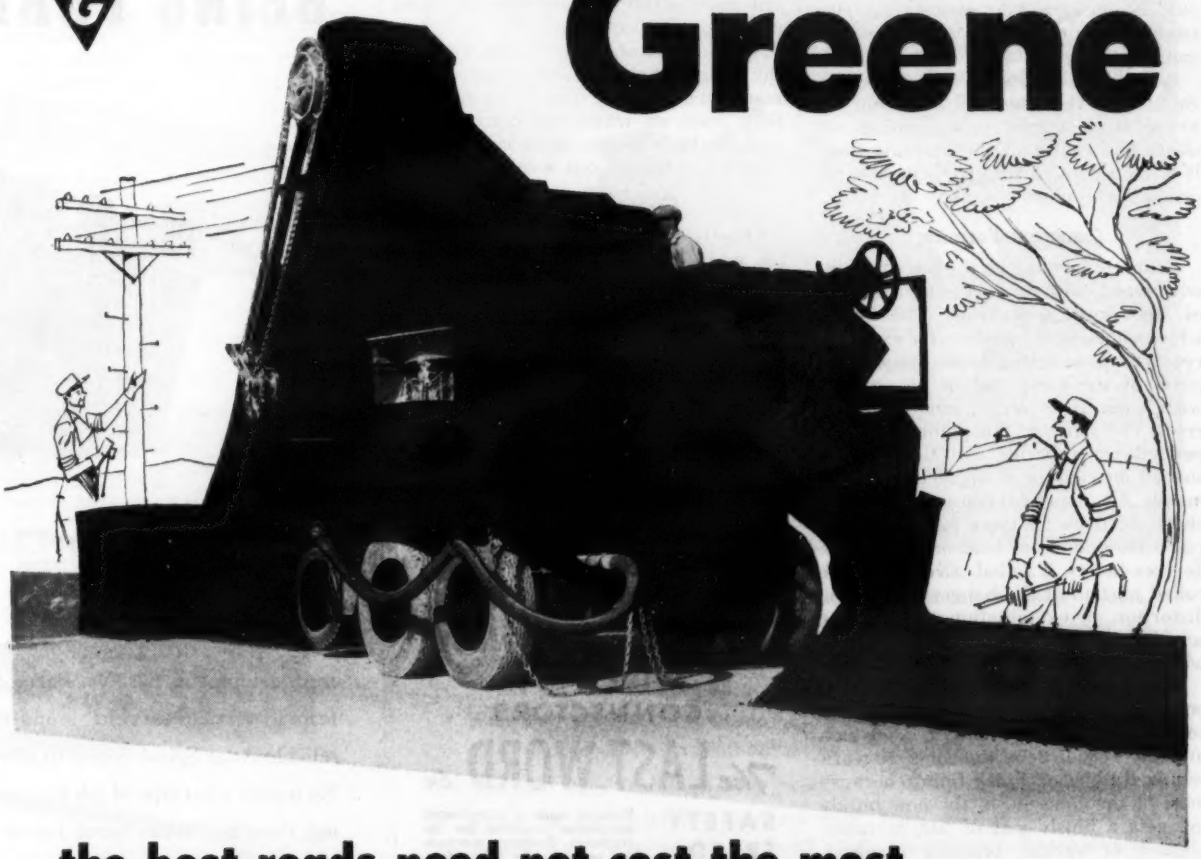
Barber-Greene



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When it comes to a choice of road-surfacing methods, the Barber-Greene Travel Plant offers distinct cost-saving advantages. It produces a properly proportioned asphalt mix—*the correct amount of bitumen for every cubic yard of aggregate—plus thorough mixing.* And you pay no premium for this performance—for volumetric measurement and controlled, twin pugmill mixing are standard Barber-Greene Travel Plant features.

Travel Plant work is a speedy one-pass operation. The aggregate windrow is picked up and continuously discharged as a ready-to-spread mix. Traffic can be maintained during the mixing process.

The B-G Mixer can be used separately in central plant set-ups; and the B-G Bucket Loader can be used independently in cost-saving loading and light excavating jobs. Write for full information.

BARBER · GREENE COMPANY AURORA, ILLINOIS

Constant flow Equipment

LOADERS PERMANENT CONVEYORS PORTABLE CONVEYORS COAL MACHINES BITUMINOUS PLANTS FINISHERS DITCHERS

Materials Handling Speeds University

(Continued from preceding page)

however, so that the power unit could be disengaged from the jinniwick in case the company got work for its Gar-Bro Power-Carts. A Braden Model 1 winch, a set of driving gears, and a Wisconsin gasoline engine made up the hoisting equipment. The A-frame and tie-back hog rods were welded from 1½-inch pipe. The frame for the jinniwick was about 5 feet square, made of 4-inch channel iron. Two 4:00 x 3 Goodyear tires carried the weight at the A-frame end, while the opposite end was supported on the single tire of the Gar-Bro driving unit.

The rig was amazingly versatile and it replaced the old clumsy gin-pole system of handling odd materials. For example, one jinniwick could hoist and run with the heavy building stone slabs fast enough to keep one mason busy. Two rigs used on this work were responsible for two stonemasons and they accounted for as high as 2,000 square feet of stone in five shifts.

The rigs are nimble, maneuverable, and powerful. When CONTRACTORS AND ENGINEERS MONTHLY visited the project, they were chained and locked to upright columns. We thought for an instant that this was because the rigs were good enough to run themselves without an operator, but Carpenter Superintendent W. L. Cohu explained that students delighted in starting the rigs, running around the floors, and raising cain generally.

A steel monorail was also used on each floor. Its route led out from the tower in a curve, straightening out above the center of the building floor. It was suspended from structural girders by metal clips.

Concrete Forming

Concrete forming on the job was done with wood, with several patented types of steel form accessories. The beams which enclosed the girders, for example, required some tricky forms because all parts of the steel had to be covered with a minimum of 1½ inches of concrete. The soffits at this point were suspended on Superior coil tie hangers, spaced on centers of approximately 48 inches. A commercial testing laboratory, checking these hangers for suitability, put 5,490 pounds of load on one of the devices before it failed. Even then the coiled portion of the hanger showed no distortion on examination, and the lag screw could be removed and replaced without effort.

Floor pours generally were formed on 2 x 6-inch joists, spaced on 12-inch centers, and faced with 1 x 6-inch lumber. Very little of the concrete work required plywood finish lining, because most of the concrete in the new building gets a finish coat of tile, terrazzo, plaster, or similar building material.

The column fireproofing around the columns was formed by panels. These consisted of two 2 x 4-inch studs, faced with 1-inch sheathing. The panels were held together at 4-foot centers by square steel ties. In all cases where concrete was placed around structural steel, Reed wire clips were fastened to the structural steel to strengthen the concrete and give it a permanent bond.

C. & E. M. Photo

Carpenter Superintendent W. L. Cohu (left) and Resident Engineer Paul Radar pause in front of the Thomas Bate & Sons job office.

The overhanging concrete canopies at each floor level were hard to form. They were formed with the usual stud and sheathing, faced with plywood because the underside was exposed architectural concrete, and then suspended from the floor above by long, thin, steel pencil rods. A drip groove slightly back from the underside was formed with wood, and the wood was allowed to drop out itself after the pour was stripped and the wood was dry.

Break-back snap ties were used on the foundation forms. All forms were made up on the job, usually on the same floor level on which work was under way. DeWalt power saws run by two carpenters turned out a lot of work.

Concrete Placing

Shortly before this article was written, a 142-cubic-yard concrete pour was made in an 8-hour shift. Considering the nature of the relatively thin slab pour, with embedded conduit work, tile, and the like to work around, it is somewhat of a testimonial to concrete-handling and pouring methods.

The concrete-mixing arrangement has previously been detailed. Mixing water was secured from the city supply. The concrete came up the hoisting tower, and when it reached the pouring level it was dumped through a transfer hopper to the waiting concrete bucket mounted on the monorail.

With few exceptions, one man could handle the concrete bucket. It rolled down to where the concrete was needed, and a special metal trough 24 feet long was hooked underneath the slip gate. Concrete chuted without any separation to the end of this trough, and the bucket was emptied quickly. The placing end of the chute was equipped with handles so two men could move it around while material was being placed.

Electric vibrators consolidated the concrete, and some rodding was necessary in the tight places. The finished concrete was cured with damp burlap. Strength tests on cylinders showed results as high as 4,490 pounds in 28 days.

The job was delayed somewhat in the early months of this year when ironworkers struck for more pay without warning. All crafts stopped work in sympathy to the ironworkers' action.

Personnel

Field work for Thomas Bate & Sons was handled under the general supervision of Kris Nielsen, Field Superintendent; Bert Wilson, Chief Estimator; W. L. Cohu, Carpenter Superintendent; and E. E. "Buck" Andersen, Concrete Superintendent. Paul Rader was Resident Engineer.

Hard-Facing Alloys

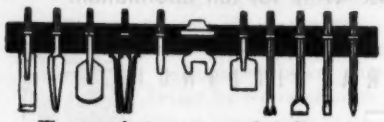
A revised edition of the "Stoody Guidebook," which covers applications of hard-facing alloys in heavy industry, has recently been issued by the Stoody Co., 11936 E. Slauson Ave., Whittier, Calif. It gives information on the choice and application of various hard-facing metals commonly used in heavy construction, cement plants, dredging operations, rock-product plants, etc.

Approximately 100 common uses for hard metals are described; data include types of metals recommended, method of application, and the approximate amount of alloy required.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 114.

"BICKNELL BETTER BUILT"

PAVING BREAKER TOOLS



We manufacture a complete line of tools for pneumatic paving breakers, rock drills and diggers.

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WIRE ROPE CONNECTORS

The LAST WORD in SAFETY SPEED SAVINGS

No heat, acids or complicated equipment required for installation. Ordinary mechanic's tools do the job, safely, even in chemical plants, powder plants and mines, where other methods would be prohibited. And they are safe to use, because they have the highest holding strength of any known wire rope or strand connectors. They assure *savings in installation* because unskilled labor can do the job easily and quickly; *savings in use* because they prolong wire rope life by damping vibration and overcoming rope fatigue at entrance to fitting . . . and because they are reclaimable.

Note ease of installation

Simply slip the sleeve over the cable, spread the strands, insert and drive in the plug then apply the socket. See what a solid and permanent joint you have by looking at it through the inspection hole put there for the purpose.

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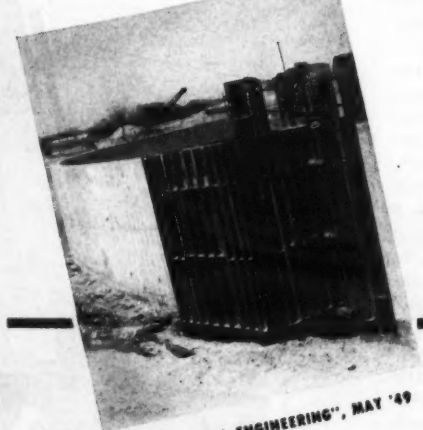
...FOR OKLAHOMA CITY'S BIG, NEW SEWAGE DISPOSAL PLANT



FROM "CIVIL ENGINEERING", MAY '49

Completed wall of 186 ft. dia. secondary filter. Atlas Speed Forms shown placed for pouring of inspection well.

Here is a tough concrete job made easy by modern, but simple, form equipment. Earl W. Baker & Co., general contractors, wanted a form that would cut costs . . . and at the same time do its job. They chose reliable Atlas Speed Forms to carry the load . . .

No matter what type of job you have, whether it be sewer, bridge, building, dam, etc., Atlas Speed Forms will give you lower costs. Our Staff of engineers, having the cumulative experiences of hundreds of other contractors with problems exactly like yours, are ready to help. Consult us on your next form problem . . . there's no obligation.

- WALLS • FLOORS
- COLUMNS • DAMS
- MANHOLES • TANKS
- SEWERS • BRIDGES
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IF YOU WRITE we will be happy to send you our new 2-color, 40-page manual, "How to Use Atlas Speed Forms." Explanations are given on how to cut concrete costs on all types of jobs.

IRVINGTON FORM & TANK CORP.

IRVINGTON 26 NEW YORK

The new Mall one-man Model 12 gasoline-engine chain saw—it has a 24-inch capacity.

A New and Improved Line of Chain Saws

A line of chain saws that is almost completely new has been announced by Mall Tool Co., 7740 S. Chicago Ave., Chicago 19, Ill. The company recently introduced the "Big 10", six new models of chain saws and four improved models. Mall states that it now has a pneumatic, electric, or gasoline-engine-powered chain saw for any application.

There are two-man, one-man, and one-hand models. The latter has an extension attachment that allows pruning or trimming to be done from the ground. Bow-saw attachments are available for all except the smallest air and electric saws. Thirty-four saws, in sizes from 12 to 144 inches, are available.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 61.

New Payroll System Can Save You Money

By installing an up-to-date payroll system, the Los Angeles Lathing Co., a contracting firm of Los Angeles, Calif., saved $2,185 a year. The system reduced the time for payroll preparation by 35 per cent, it is reported.

When the company decided some time ago that payroll preparation costs were getting far out of line, officials responsible for the payroll turned to machines for a possible solution. They contacted the Todd Co. of Rochester, N. Y., through its local sales office, to find out if it was possible to install a payroll system that would do the job with only a modest investment in equipment. What they were looking for was economy and protection, with close payroll control and maximum convenience for employees.

Todd salesmen suggested the Form-Master system as especially suited to contractors' payrolls. In this particular contracting firm, from 13 to 15 weekly entries have to be made for each of the 275 employees, including records of overtime, double-time, earnings by job, and other special accounts. Altogether these total some 4,150 separate entries a week.

The key unit of the new system that was installed is the Form-Master 64, a simple device requiring very little desk space. In this case it is used in conjunction with the widely known ABC payroll checks. Here is the process: Time reports of the employees are phoned in from the various jobs out in the field and are posted to the payroll sheet. Then the employee's retainable receipt, earnings record, the payroll sheet, and check register—four entries in all—are prepared in a single writing on the Form-Master. Next, the payroll sheet is balanced and the checks are written and protected on a Todd Protectograph checkwriter.

The entire job now takes 36 hours where it used to take 55 hours. Records are complete every payday because they are by-products of the original posting. The system eliminates copying errors and transposition of figures, and prevents discrepancies between the employee's check and other payroll records.

Further information on the Form-Master system for payrolls may be secured from the Todd Co. Or use the Request Card at page 16. Circle No. 62.

Stud Welder Sales Mgr.

Appointment of Verne W. Bender as Manager of Distributor Sales has been announced by the Nelson Stud Welding Division of Morton Gregory Corp. With headquarters at 844-54 Folsom St., San Francisco, Calif., he will work directly with salesmen in distributor organization of the west and southwest.

¾ TON WINCH

$30 LESS ROPE

This Hand Winch is ideal for moving and installing heavy machinery, loading trucks, hand derricks, cranes, gin poles, loading logs, sawed lumber, loading implements on trailers, hoisting silage, pulling wells, etc. Can be bolted anywhere and operated in any position. Made of electric steel; bronze bushed; 2 speeds. 8 16 to 1 for heavy loads. 3 to 1 for fast operation ... self locking to hold loads at any position.

Overall Dimensions 12½ in. x 7½ in. x 7 in. Handle 10 in long. Drum size 3 in. dia. x 6 in. long x 6 in. dia. flanges. Will hold 100 ft. ¼ in. Wire Rope. Illustrated with 50 ft. ¼ in. Wire Rope. Shipping Wt. 27½ lbs. GUARANTEE —Five-day return privilege.

$39.50 WITH 50 FT. of ¼ in. WIRE ROPE

Send remittance with order and we prepay postage.

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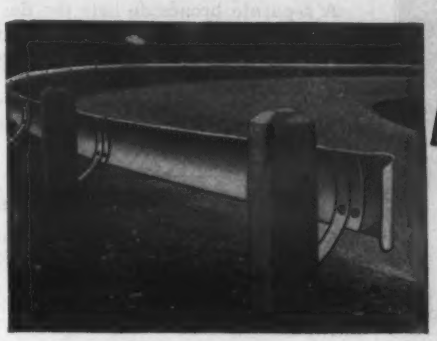

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Last winter's "OPERATION SNOWBOUND" proved the economy of La Crosse low boys in moving big equipment QUICKLY from one stricken area to another.

TO REDUCE THE COST of opening roads after deep snows, remember *adequate trailer capacity is just as important as adequate equipment.* For with trailers you can increase the efficiency and economy of all your big plows and dozers — by moving them into critical areas faster . . . getting them working faster . . . on to next assignments without delay.

You will also find heavy-duty La Crosse low beds especially well fitted for winter hauling because they *trail easier on slippery roads . . . are easier to load and unload . . . have extra-capacity platform on flat gooseneck for carrying extra tires, sand, cinders, etc.* Choice of single, dual or tandem axle models from 6 to 67 ton capacity — standard or custom built.

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New Hydraulic Action

SOIL MOVER

It Loads . . . It Carries . . . It Dumps . . . without Stopping! FASTER . . . EASIER!

Carry the load . . . don't drag it. Bucket dumps backwards for easier load spotting and leveling. Makes it easier to fill those hard-to-get-at places.

4-MODELS!

MODELS WR 100 & 200

Wheels behind and inside frame for close work to buildings, ditches and excavating. Model 100-54" cut. Model 200-72" cut.

MODELS WS 100 & 200

Wheels on side of bucket. Wide variety of uses. Ideal for filling in foundations. Model 100-54" cut. Model 200-72" cut.

Write for FREE descriptive literature TODAY! Write:

THE SOIL MOVER CO.

Dept. CE-1 COLUMBUS, NEBRASKA

The Whiteman disk float comes in two new models—one with a disk for floating only, the other a combination machine with a disk for concrete floating and for quick conversion to standard trowel floating and finishing.

Convertible Float

Two new models of disk floats are now being made by Whiteman Mfg. Co., 3249 Casitas Ave., Los Angeles 26, Calif. The first, the Model S.C., is a combination machine with a disk for concrete floating and arranged for quick conversion to standard trowel floating and finishing. The Model S.F. has only the disk for floating.

Both models are powered by Wisconsin 5-hp engines. The 24-inch cast-iron disk will revolve at speeds from 50 to 120 rpm. The Model S.C. has 10 x 18-inch snap-on float trowels and 6 x 18-inch tool-steel finish trowels.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 68.

Overhead Shovel Loader

A catalog on the Sargent Overhead shovel loader is available from Oliver Corp., Industrial Div., Cleveland, Ohio. It explains that the Sargent Overhead is most commonly used as a power shovel but will also serve as a bulldozer, backhoe, anglegrader, tractor, or snow loader.

The bulletin points out that the unit is easily mobile and conveniently hauled on a fast truck. Powered by a Cletrac crawler, the overhead is quickly convertible into a cable-operated bulldozer or anglegrader. It may be used for snow loading by taking off the excavating bucket and applying a snow bucket. For shovel work, eight standard buckets of different capacity and construction may be obtained.

A separate broadside lists the design features and specifications for the Models B and D backhoe as an accessory to the overhead shovel.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 7.

Improvements for Pavers

A 4-page folder on two design improvements now standard on Rex concrete pavers has just been issued by the Chain Belt Co., 1666 W. Bruce St., Milwaukee 4, Wis.

The bulletin describes the new hydraulic bucket which provides positive control of spreading. The same lever controls bucket travel and bucket opening. The opening action of the pivoted gate can be stopped at any desired point. The bucket can be partially emptied and the door closed if necessary.

The second feature described in the folder is the 10-foot bucket clearance at the end of the boom. This, the company says, gives the maximum needed clearance without undue strain on the paver mechanism. Here also, for ease in operation, the one lever controls boom elevation and boom swing.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 25.

Power-Rating Chart

A power-rating chart is one of a number of catalogs issued by the Waukesha Motor Co., of Waukesha, Wis., on its line of engines and power units. This chart is for all models of the company's gasoline, natural gas, butane, diesel, and Hesselman fuel-oil engines. It is a complete tabulation, listing the model, bore and stroke, displacement, dynamometer horsepower, permissible speeds, and loads. The rear cover shows 12 photographs of typical uses of Waukesha power.

Catalogs on individual types and models of Waukesha engines may also be had. They fully describe the particular model and include photographs and specifications.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 65 for the power-rating chart. For catalogs on particular types of engines, circle No. 66 and specify the type in which you are interested.

Helmet for Safety

A new shock and heat-resisting Tuf-Boy safety helmet is now offered by the Parker Safety Equipment Co., 785 Lyons Ave., Irvington 11, N.J. It weighs 12 ounces, withstands 80 foot-pounds under ball impact tests, is cool and waterproof, and resists up to 3,000 volts of electricity, the company says. The crown and brim are of laminated duck and impregnated Bakelite molded under pressure. The leather cradle suspension inside is adjustable and acts to cushion blows. The lacing is of Nylon.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 106.

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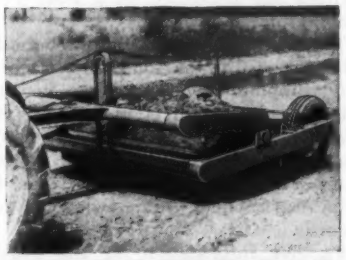

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Don't tie up costly, heavy equipment on a finish grading job which Gledhill can handle easily and economically.

This small, sturdy earth mover is only one of several Gledhill machines which are both efficient and economical.

Please write for complete specifications and prices on this and other pieces of Gledhill equipment!

Graders • Shapers • Levelers • Snow plows

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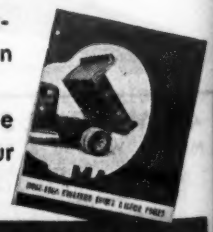
Body Illustrated: Model RB-70, standard 7 cu. yd. rock body, specially constructed for quarry and rock work. Made in all capacities. Mounted over standard double-lift arm type under body hoist or telescopic hoist, depending on capacity and use.

Keep ahead of schedule with "On The Job" Design

In Marion Bodies and Hoists you get dependable loading, hauling and dumping performance that keeps you "loads ahead." With "On The Job" design you get sturdy construction features developed by Marion engineers in the field under actual operating conditions.

Ask your Marion Distributor about the Marion unit designed "on the job" to meet your special requirements, or write direct.



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DUMP BODIES and HYDRAULIC HOISTS

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Use the Request Card Between Pages 16 & 1 To Obtain Further Information or Printed Matter on Any Produc Advertised or Described Editorially in This Issue

Concrete Is Placed In Clark Hill Dam

(*Continued from page 18*)

tion are 62 feet. The maximum width, slightly over 200 feet, is in the spillway section, and includes the bucket at the downstream toe. The other portions average 160 feet in width.

An inspection gallery, 7 feet high x 5 feet wide, throughout the entire length of the concrete portion of the dam is located in the base of the structure, about 10 feet from the upstream face, and about 10 feet above the rock foundation. This gallery is for inspection, to check for any possible seepage under the dam and provide for grouting operations in case seepage occurs. The dam also contains a gallery for operation of the sluice gates and the penstock by-pass valves.

The first-stage cofferdam of cellular sheet-pile construction was designed to pass 140,000 cfs of water, and encloses monoliths 1 through 27. This includes the west non-overflow section and the greater portion of the spillway in which are built eight 4 x 9-foot sluices. The second-stage cofferdam, of similar design, will protect the construction of the remainder of the dam. This will include the intake and powerhouse section which will contain seven penstocks for conducting water to the seven turbines.

The penstocks are 20 feet in diameter, and are built of plate steel varying in thickness from 9/16 to 7/8 inch. Each penstock can carry a maximum of 4,860 cubic feet of water per second to its turbine. The turbines are being constructed under a separate contract by the Newport News Shipping & Dry Dock Co. The generators will be built and the powerhouse constructed under separate contracts. Work on the clearing of 70,000 acres in the reservoir area has started with the award of a contract for clearing 10,000 acres. The site has 5 homes for personnel on the project.

Steel Work Trestle

Because of the dam's great length, all concrete is placed from a steel trestle which extends out from the right bank or Georgia side of the river where the aggregate-production and concrete-mixing plants are located. Materials come in from the South Carolina side on either the access road or railroad, and cross the river on a combined rail and vehicular bridge below the dam site. At present the trestle goes out to the end of the first-stage cofferdam, but when the second cofferdam is completed it will extend 2,300 feet across the river.

Hung beneath the deck of the trestle is a catwalk. On the deck are two standard-gage tracks with a switch at the far end. Over these tracks move the work trains carrying the buckets of concrete to the three American Revolver cranes that place the concrete. The cranes lower the buckets to either side of the trestle, or directly below through an opening left along the center of the deck between the tracks.

The R20 American Revolvers are electrically operated from a trolley outrigger making contact with a cable strung along the upstream side of the trestle below deck level. The three cranes are rated at a 20-ton lifting capacity on a 75-foot radius, or 11 tons at 115-foot radius. Their booms are 125 feet long. They operate over a 32-foot-gage track, and the distance from rail to boom pin is 60 feet. All concrete is placed with these three cranes, with the exception of a retaining wall along the west bank that could not be reached from the trestle. A stiffleg derrick was set up for this particular pour.

Concrete Plant

All aggregate for the 1,072,000 cubic yards of concrete being poured in the structure is produced on the site, as described in the article on page 19. A conveyor system brings the four grades of crushed stone and sand up to the top of the C. S. Johnson batching and mixing plant which has a total storage capacity for 750 tons of material. The mass concrete in the dam contains both portland and natural cements. Portland cement is obtained from six different plants: Alpha, Lehigh, and Lone Star brands from Birmingham, Ala.; Penn Dixie from Richard City, Tenn.; Signal Mountain from Chattanooga, Tenn.; and Universal from Leeds, Ala. The natural cement is purchased from the Louisville Natural Cement Co. at Louisville, Ky.

The cement comes to the job site in bulk cars, and is unloaded by screw conveyors and lifted in an enclosed elevator either to a two-compartment bin (one for natural and the other for portland) at the top of the plant, or fed into storage silos at the side of the plant. Two silos, each with 7,500-barrel capacity, hold the portland cement, while the natural cement is stored in a single 4,800-barrel silo.

Water for the project is pumped from the Savannah River into a 1,500,000-gallon reservoir, also on the right river bank along with the rest of the construction plant layout. Water for drinking purposes and for the concrete mix is filtered and treated, and pumped into a separate 50,000-gallon elevated storage tank located on a hill. From there it flows by gravity to the mixing plant.

(*Continued on next page*)

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GENERAL DUTY	4D-76	21,356	6,279	15,077	11,205

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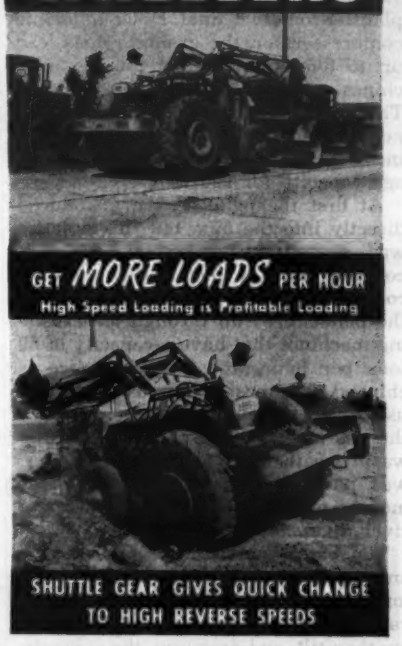
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Concrete Is Placed In Clark Hill Dam

(*Continued from preceding page*)

Ice in Mix

At times last winter the water for the mix was heated by a boiler in order to keep the temperature from dropping below 40 degrees F. But keeping the mix cool is the major problem over most of the construction season. For this purpose ice is manufactured in a structure set up alongside the mixing plant. From two dual Frick ammonia compressors on the ground, pipes lead up to five Vilter 30-ton Pak Ice machines and one Vilter water cooler. These machines produce 150 tons of ice per day in the shape of pellets, 1½ inches in diameter. The plant has storage capacity for 220 tons of ice.

At first the pellets were introduced directly into the mix, but this practice was discontinued when it was discovered that the pellets did not melt completely within the mixing time. Now the pellets are run through ice-crushing machines that have a capacity of 50 tons per hour, and where the ice is chipped up almost as fine as snow. The use of ice keeps the temperature of the mix below 70 degrees F even in the warm weather. No concrete, however, was poured during the hot summer months of July and August, when the river diversion was under way.

The batches of stone, sand, cement, and water are weighed out, then mixed for 2½ minutes in three Koehring 4-yard concentric zone mixers. The mixers then tilt, and discharge the concrete into a hopper which empties into C. S. Johnson 4-yard bottom-dump Lo-Slump concrete buckets. Three of these buckets are carried on standard 40-foot flatcars that provide enough space for setting up another bucket. The flatcar with its load of concrete is drawn by Plymouth 10-ton diesel locomotives. Five such concrete supply trains are on the job.

The Mix

The mass, non-reinforced concrete in the dam, including the bucket section, totals 983,500 cubic yards. Face concrete, which is the outer 4 to 8-foot portions, generally contains four bags of cement to the yard. The interior concrete, which naturally is the major item, has a leaner mix of three bags to the yard. The cement is a blend of 75 per cent type 2 portland, and 25 per cent natural cement. Vinsol resin, an air-entraining agent, is interground in the natural cement at the mill. For the interior mass concrete the air may vary from 3 to 6 per cent. On the face-concrete pours the air is more rigidly controlled and held to around 3 per cent. This is done by varying the weights of the two types of cements.

The dry weights of a typical 4-yard batch of mass concrete are given in the following tabulation:

Water (including ice)	768 lbs.
Natural cement	260 lbs.
Portland cement	844 lbs.
Sand	3,326 lbs.
Fine stone (¼-inch—No. 4)	2,130 lbs.
Medium stone (1½-inch—¾-inch)	2,342 lbs.
Coarse stone (3-inch—1½-inch)	2,768 lbs.
Cobbles (6-inch—3-inch)	3,407 lbs.
Total batch weight	15,845 lbs.

The air-free weight of this mix is 154 pounds to the cubic foot.

Concrete Placing

Wooden cantilever forms are used throughout. They are built in 10-foot panels to go along the bulkheads, and 16-foot panels for the face work. Thus only three forms are required for each side of a 48-foot non-overflow and spillway monolith. The panels are constructed of double 5/4-inch lagging, placed in opposite directions, for a total thickness of 2½ inches. They are 5 feet high, the size of the average lift. The typical 10-foot bulkhead panel is braced with three 6 x 6 horizontal sub-wales that transmit the load to the vertical studs which are double 4 x 12's, 10 feet long. The 10-foot bulkhead panel has three pairs of studs, while the 16-foot face panel has four such pairs. The bottoms of the studs are bolted into the concrete lift below. The panels are raised for the next pour by a system of aluminum A-frame and ratchet hoists.

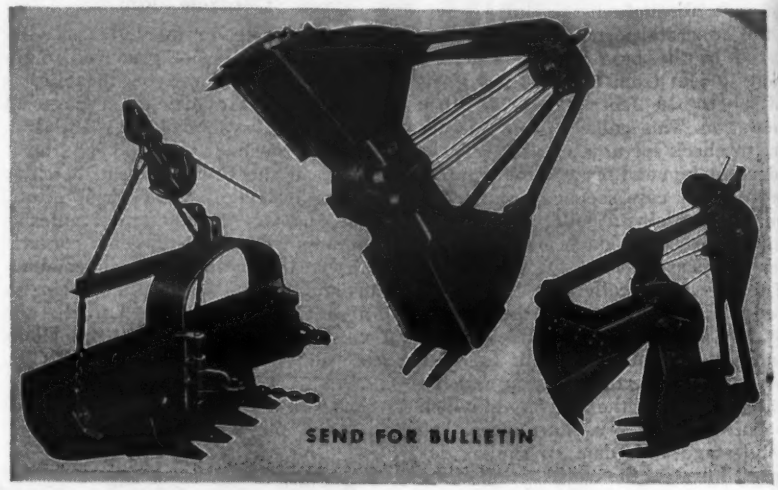
At the beginning of the job the bedrock foundation for the dam was covered with a 10-foot layer of concrete laid in 2½-foot lifts. After that the normal lift is 5 feet. However, if 15 days elapse before another lift is added to a monolith under construction, then the concrete is added in four 2½-foot lifts before the 5-foot pours are permitted. This is done so as to maintain a uniform temperature gradient curve.

In placing the concrete, the locomotive hauls a flatcar containing three 4-yard buckets out on the trestle, entering on one track and switching over at the far end to return to the plant on the other. The plant is about 200 feet from the west end of the trestle. The crane first sets down on the car an empty bucket from a previous car, after its contents have been discharged into the forms. Then the three buckets are taken off one by one. As soon as the last one is lifted into the air, the train returns to the plant for more concrete, since the last bucket is returned to the plant on the next car.

Pour 'Round the Clock

As the concrete is discharged into the forms, it is vibrated with Jackson electric 90-cycle frequency vibrators. Later, when the concrete has hardened, and in preparation for pouring the succeeding lift, the surface is roughened and cleaned up with air and water jet pres-

(*Concluded on next page*)



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The "Spray King" has single valve control, a choice of Low Pressure or Torch Type Burners, Full Circulating Vacuum Flow or Standard Suck-Back Spray Bars up to 24 ft. in width. The bars are end-folding or can be non-folding.

Adjustable, manual operated, ground clearance controls for raising and lowering the Spray Bar. Heat Chamber for pump and valves. Filler connection at the rear of the Distributor. These are but a few of the many features of the "Spray King," the new low cost Littleford Pressure Distributor. For further information write for Bulletin Z-14H.

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sure hoses. This is followed by sand blasting which insures a good bond with the concrete going on top. The horizontal surfaces of the monoliths are cured by being continuously soaked with water, while membrane compound is sprayed on the bulkheads. Concrete is usually placed 24 hours a day. The maximum placed in any one day has been 3,964 cubic yards.

The section of the dam within the first-stage cofferdam could not of course be constructed to its full 200-foot height since the river was to be diverted through the west half of the structure. Accordingly, eight odd-numbered monoliths in the spillway section (11 through 25) were left low at elevation 190, which is the same as the flow line of the sluices. The crest elevation of the spillway section is 300, while the elevation of the roadway above the gates is 351. At this stage of the construction the even-numbered monoliths are built up to elevation 210. In addition to the eight monoliths left low, the river will also use the eight 4 x 9-foot sluices in the adjoining even-numbered monoliths.

Before concreting has stopped in the western half of the dam, tie-in cells were being constructed within the first-stage cofferdam. Once the tie-in is made, the existing cells will be removed, and the second-stage cofferdam will be constructed. The cells are 48 feet in diameter, consisting of Bethlehem 15-inch straight web piling weighing 35 pounds per linear foot.

Quantities and Personnel

One of the major items in the $26,456,197 contract of Allstates Constructors, Inc., is a $750,000 lump sum for the care and diversion of the river. This includes the construction of the second-stage cofferdam. Other specific items in this contract include the following:

Common excavation	103,000 cu. yds.
Borrow excavation	1,900,000 cu. yds.
Rock excavation	67,000 cu. yds.
Compacted fill	1,435,000 cu. yds.
Mass concrete in dam	947,000 cu. yds.
Mass concrete in bucket	36,500 cu. yds.
Concrete in piers and walls	52,500 cu. yds.
Concrete in west embankment wall	12,600 cu. yds.
Other concrete	3,950 cu. yds.
Steel reinforcement	6,202,000 lbs.
Taintor-gate anchorages	1,038,000 lbs.
Spillway bridge structural steel	1,127,000 lbs.
Penstocks, supports, frames, etc.	1,607,500 lbs.

Allstates Constructors, Inc., has had as many as 1,450 men employed on the project at one time. C. D. Riddle is Project Manager, Steve Richards is Superintendent, and T. F. Taylor is Job Engineer for the contractor.

For the Corps of Engineers, Department of the Army, Grady L. Bain is Resident Engineer, and A. C. Marane is Assistant Resident Engineer. William T. Neelands is Materials Engineer on the job.

The project is under the direction of Lt. Col. Robert Erlenkotter with headquarters at Savannah. Clark Hill Dam is in the South Atlantic Division of the Corps of Engineers of which Colonel B. L. Robinson is Division Engineer with headquarters at Atlanta.

Black-Top Paver Has New Stone Attachment

A new stone attachment for the Adnun Black Top Paver has been announced by Foote Co., Inc., of Nunda, N.Y. It consists of rubber-tired wheels carrying standard tires and it is designed to replace the steel rollers under the rear of the paver which are supplied for laying black-top.

The rubber-tired attachment is to be used when laying stone or chips, to gain the full effectiveness of the four-wheel-drive of the Adnun and to reduce slipping. It is said to improve traction and eliminate pitting damage to the roller. The attachment can be placed on any Adnun using the large steel rollers.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 101.

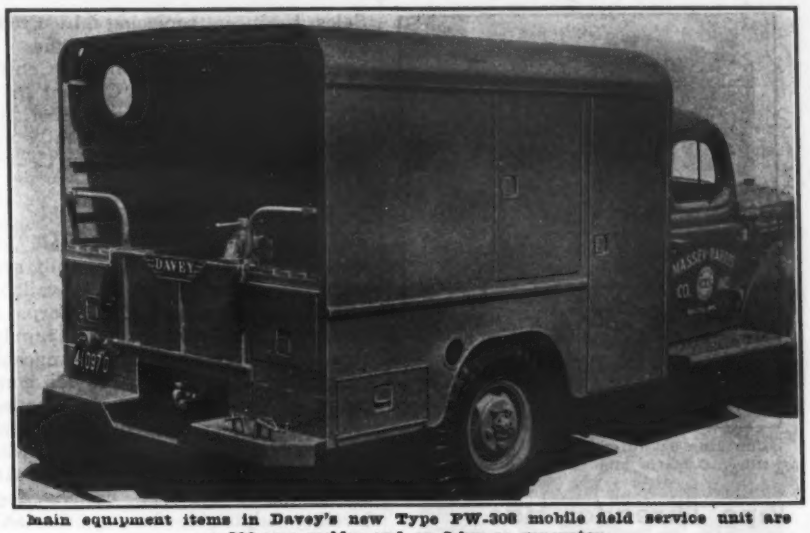
Field Service Unit

Production of a new mobile field service unit, known as Type PW-308, is announced by Davey Compressor Co. of Kent, Ohio. This unit, mounted on a four-wheel-drive truck, is said to have all the equipment necessary for servicing construction machinery.

Main equipment items include a 300-amp welder and an 8-kw ac generator. These are driven directly from the truck engine through a Model P-80 Davey power take-off. Power for the unit's high-pressure lubrication equipment is provided by a Davey Little Workhorse compressor operating at 150-pound pressure.

Other equipment includes: an oxy-acetylene welding, cutting, and brazing outfit; an 8-inch motor-operated bench grinder; a portable arbor press; floodlights; a 7,500-pound winch; and a complete complement of service tools.

The all-steel utility and service body provides space for the driver and six passengers. The unit is complete with tool boxes and storage bins. The body is waterproof and can be locked securely.



Main equipment items in Davey's new Type PW-308 mobile field service unit are a 300-amp welder and an 8-kw ac generator.

Further information may be secured from the company. Or use the Request Card at page 16. Circle 111.

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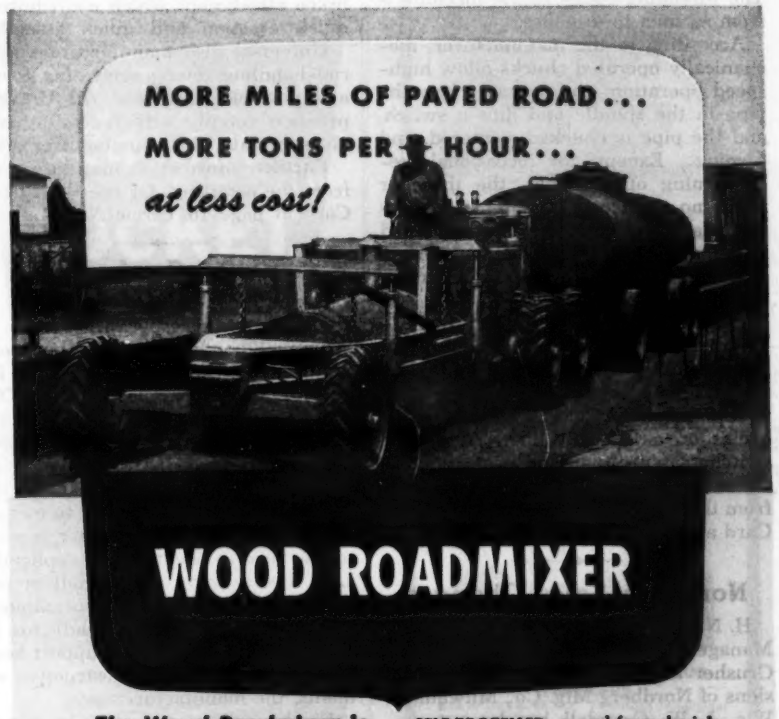

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Chucking is automatic on this 4-inch Thred-O-Matic pipe-threading machine.

Pipe Threader Has Automatic Chucking

A new Thred-O-Matic 44 4-inch pipe-threading machine has been brought out by the Quijada Tool Co., 5474 Alhambra Ave., Los Angeles 32, Calif. The threading range of the machine is from ½ inch to 4 inches.

According to the manufacturer, mechanically operated chucks allow high-speed operation; the operator lays the pipe in the spindle and flips a switch, and the pipe is chucked, centered, and turning. Except for occasional re-sharpening of the jaws, the threader needs no service or maintenance, says Quijada. The chuck jaws are hobbed like pipe wrench jaws; the more torque that is applied to the pipe, the firmer the gripping power.

The 44 has done away with a thread-length gage and uses instead a large red blinker light that flashes every two revolutions. The threader is powered by a 3-hp motor operating at 50 to 60 cycles on a 220-volt line. Automatic switches assure overload protection.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 105.

Nordberg Sales Changes

H. N. Propp is now Assistant District Manager, Central Territory, for the Crusher and Process Machinery Divisions of Nordberg Mfg. Co., Milwaukee, Wis. J. W. Crandall has been transferred from Milwaukee to the San Francisco District Office to serve as Sales Engineer, replacing Mr. Propp.

J. M. Thistlewaite continues as Special Representative in the Central Territory for Nordberg's Crusher Division; his headquarters are at Sheridan, Ind. Jack B. Bond was recently appointed District Manager of the Central Territory.

Steel Scaffolding

All types of Universal Ezebilt sectional steel scaffolding are available from the Universal Mfg. Corp. of Zelienople, Pa. This welded tubular steel scaffolding has interchangeable components designed to provide combination scaffolding for construction, maintenance, and decorating work. The various designs of panels and connecting members, supplemented with substantial brake-type casters, leg-leveling adjustable bases, adjustable putlogs, material hoist arms, and brackets permit safe and rigid erections to meet any special requirements.

The use of wing nuts, bolts, and loose fittings is entirely eliminated by the patented gravity locking sleeve brace attachment which contributes to quick erection and quick assembly.

Universal also manufacturers material-handling towers, elevating towers, and portable bleachers. All Universal products comply with the safety codes of each state, the manufacturer states.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 84.

Floor Surfacing

A new floor-surfacing material, designed to resist especially severe destructive conditions, has been announced by United Laboratories, Inc., 16801 Euclid Ave., Cleveland 12, Ohio. It is called Quartex.

It is an extremely hard, non-porous material produced from quartz, and from iron-reinforcing and cementing agents. It is delivered ready to mix and only a small amount of water is added to the mix at the time of application. Laid directly over old asphalt or concrete floors to a depth of approximately ½ inch, it is ordinarily ready for use in 36 hours. Quartex can support heavy loads as well as resist destructive elements, the manufacturer says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 104.

Catalog on Tanks Made Of Prestressed Concrete

A 24-page catalog called "Preload Tanks", covering all details of these wire-wound concrete tanks, has been put out by The Preload Corp., 211 E. 37th St., New York 16, N.Y. The booklet discusses the evolution, uses, design, and construction of the tanks. It also contains complete specifications for building them. The booklet is fully illustrated.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 141.

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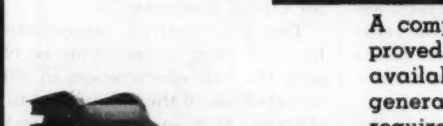

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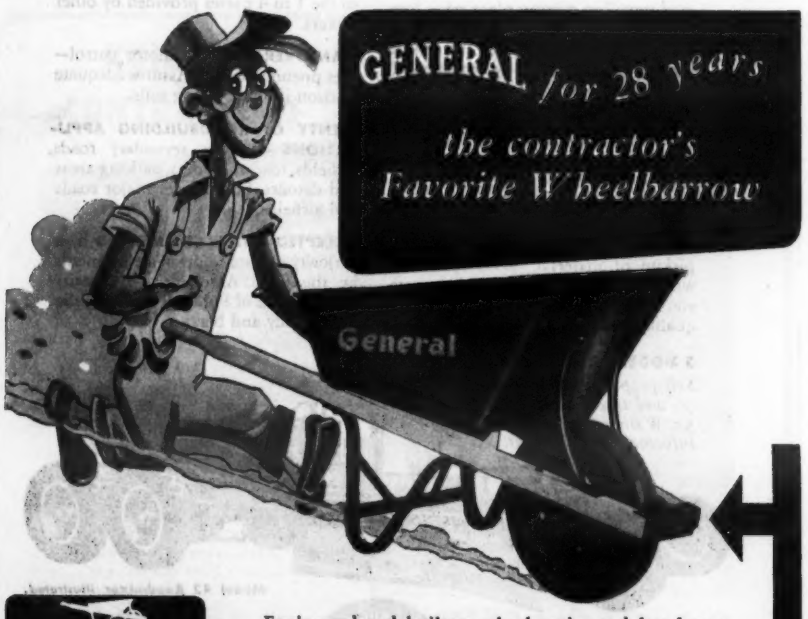

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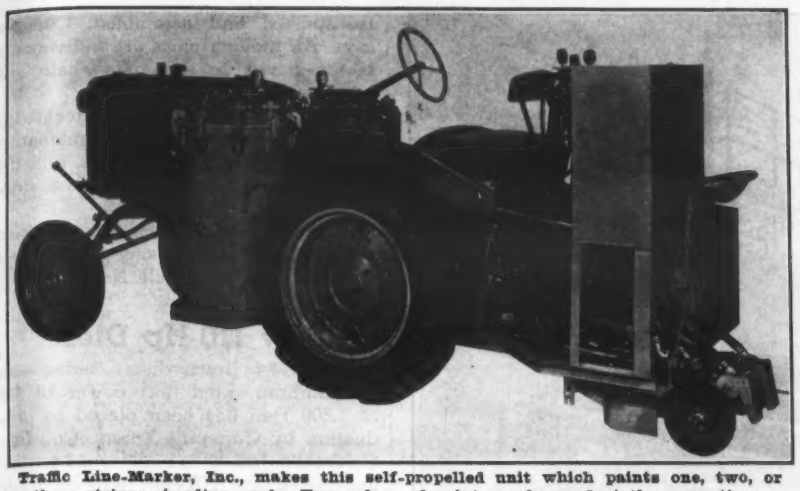

Traffic Line-Marker, Inc., makes this self-propelled unit which paints one, two, or three stripes simultaneously. Two colors of paint can be used at the same time.

Traffic-Line Marker

A traffic-line marker which is self-propelled and can be used for painting one, two, or three lines simultaneously is manufactured by Traffic Line-Marker, Inc., 6450 Le Grand Ave., Detroit 11, Mich. A crew of 3 or 4 men can operate the unit, trailer and truck. The narrow width of the unit is designed for safety on the highway.

Guide shoes are the standard 4-inch width, but other widths are available if needed. The spray gun operates automatically and all spraying and bead-dispensing operations are controlled from the panel of the marker. The bead container holds 400 pounds of beads for supplying the three dispensers. Two colors of paint can be used at the same time from two 30-gallon tanks. Beads can be dispensed on one, two, or three lines as the marking requires. Air agitation is provided in the paint tanks.

One of the features of the line marker is an auxiliary hand gun for spraying guardrails, sign posts, water plugs, and other small units along the highway.

Further information on this traffic striper may be secured from the company. Or use the Request Card at page 16. Circle No. 57.

Concrete-Testing Molds

A catalog on the Moline concrete test cylinder molds, for making concrete compression-test specimens, has been issued by the Moline Iron Works, 130 Second St., Moline, Ill. It lists two models: Model A for making 6 x 12-inch cylinders, and Model B for making 8 x 16-inch cylinders. Features of these molds and photographs showing their use are included in the folder.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 150.

Larger K & E Quarters; Equipment-Setting Job

A delicate equipment-setting operation is being carried out at a new plant which is being readied for Keuffel & Esser Co. at 1320 Margo St., Los Angeles, Calif. Much of K & E's paper-coating machinery is now being installed by highly trained crews of MacMen, Inc., specialist in equipment setting.

At a cost of over $500,000 a former 4-story warehouse is being completely reconditioned and a 2-story annex is being constructed to give K & E a total of 40,000 square feet of plant, office, and retail store space. October 1 has been tentatively set as the opening date for the new quarters.

Blueprinting and photostat machines are being dismantled, brought from the former location, and re-assembled to form the nucleus of the reproduction department on the first floor. A new method of storage for papers, cloths, inks, etc. will make possible a large inventory. Feature of the third floor will be thorough air conditioning and humidity control with York equipment. To protect highly sensitive instrument-repair equipment, vibration will be eliminated in the modern annex through special reinforced construction.

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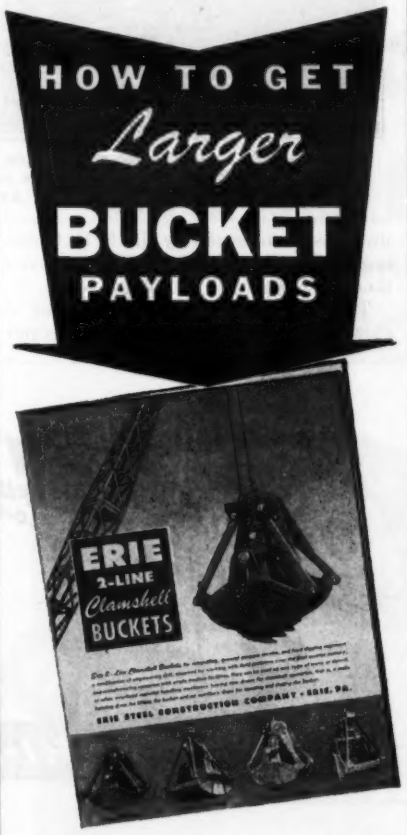

This new Erie Catalog makes it possible to quickly choose, from the 4 classes of Erie 2-Line Buckets, the right bucket for *your* crane and material. Perhaps your crane can operate a larger bucket, for Erie alloy welded steel buckets result in greater payloads through scientific bucket weight reduction. Remember, that on bucket work, the cost of the crane and the operator all ride on the bucket. Send for this helpful catalog or outline your conditions and our engineers will make recommendations.

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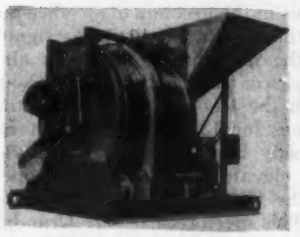

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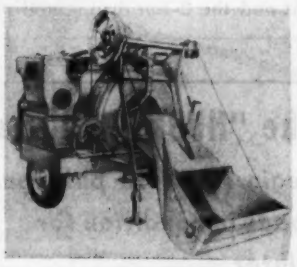

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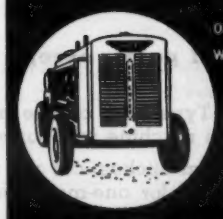

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Flag Flies as Steel Work for Skyscraper Is Completed in N. Y.

On July 26 the traditional flag-raising ceremony marked completion of the steel framework atop the 36-story air-conditioned office building at 100 Park Ave., New York City. (See C. & E. M., August, 1949, pg. 5.) The flag-raising, 500 feet above street level, followed immediately after the highest piece of structural steel had been bolted into place, and less than 5 months after the steel framework on the giant building had been started on March 1.

A new record in skyscraper construction was signalized. "Originally scheduled for completion on May 1, 1950, the building is now being readied for initial occupancy in late December of this year, which is barely one year since the start of excavation," declared Lou R. Crandall, President of the George A. Fuller Co., general contractor for 100 Park Avenue, Inc., owner. "This represents an unprecedented accomplishment in the erection of an office building of this type. Of particular significance is the fact that progress on all other phases of the construction has kept pace with the steel. For example, the machines for 12 of the 20 elevators have already been installed, and several of the elevators are already in operation to the 17th floor.

"This speed record", Mr. Crandall emphasized, "was made possible through a system of advance planning and pinpoint coordination of all operations, in which exceptionally good labor productivity and cooperation played a significant part."

Participating in the flag-raising ceremonies were steel workers John F. Brown, former Sergeant, U. S. Infantry, World War I, who fought in five major engagements in France; Joseph F. Mitchell, former Technician Fifth Grade, who served with the U. S. Army Engineers for 20 months in Greenland, during World War II; and Edward R. Lundquist, former Corporal, U. S. Army Signal Corps, who served 28 months in the ETO during World War II, and participated in four battles.

A new record in skyscraper construction is signalized by the traditional flag-raising ceremony. It marked completion of the steel framework for the 36-story office building at 100 Park Avenue, New York City.

Asphalt-Plant Folder

A folder describing the new Cummer 1-ton portable and stationary asphalt plant and the 2-ton drying and mixing unit has been issued by the F. D. Cummer & Son Co., 608 Keith Bldg., Cleveland 15, Ohio.

The 1-ton asphalt plant carries a company guarantee of 45 to 55 tons per hour. This figure is based on 5 per cent initial water content, dried to within 0.5 per cent and heated to 350-400 degrees F. The complete plant weighs 43 tons, and its component parts are easily transported and assembled, Cummer says. All moving parts are individually motor-driven to eliminate chain and belt drives.

The catalog also includes information on the Cummer two-fire combination drier-cooler, Cummer towers, and the Cummer mechanical feeder with storage bin.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 39.

New 110-Hp Diesel

A new 4-cylinder diesel engine with a maximum rated horsepower of 110 at 1,800 rpm has been placed in production by Cummins Engine Co., Inc., Columbus, Ind. This high-speed engine, designated the HR-400, will be made for automotive, industrial, and marine applications.

Mounting dimensions for the basic industrial model are approximately 43 x 29 x 47 inches. The HR-400 has a 5⅛-inch bore, a 6-inch stroke, and a piston displacement of 495 cubic inches. It uses the Cummins fuel system; is equipped with standard two-valve heads; and features a new increased-flow lubricating system.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 152.

Joins Mack Trucks, Inc.

Henry W. Dodge has joined Mack Trucks, Inc., as Executive Vice President with special responsibility for sales and advertising. Mr. Dodge will make his headquarters in Mack's home office, Empire State Bldg., New York City.

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Sturdiest Pull-Type now on the market. An extra fine Terracer. Will complete over a mile of normal terrace per day. This machine will surprise you in what it will do.

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CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Ave., New York 16, N. Y.

Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Exactly What Items Were Covered by Canal Contract?

THE PROBLEM: *A basalt formation through which a Government irrigation canal was excavated was unstable and porous. It was therefore impossible to excavate to the prescribed wall lines, within tolerances allowed by the specifications, without overbreak and without removing loose blocks liable to fall into the canal. Likewise, on excavating to the neat lines of the foundation subgrade, soft rock was encountered, presenting an unsuitable base for concrete construction.*

The contracting officer directed that the material be removed to a solid foundation below the neat lines, and permitted backfilling of the area to subgrade with concrete, the materials for which were furnished by the Government. But the officer required the backfilling to be poured in monoliths with the concrete base structure called for by the contract, to avoid leaving a seam.

(1) Was the contractor entitled to be paid for excavation outside the prescribed wall lines?

(2) Was he entitled to pay for the concrete backfilling below the foundation subgrade?

THE ANSWERS: No, decided the United States Court of Claims. (Orino v. United States, 77 Fed. Supp. 938.) The court noted that the contractor did not contend that he was entitled to collect on the theory of performance of extra work. The question presented was whether the work he did fell within the contract undertaking and was to be paid for at the unit prices therein specified.

As to the walls, the court said: "The contractor was required by defendant to remove the loose rock and overbreak, . . . but it does not appear that he was directed to remove any rock from outside the neat lines which was not loose and not liable to fall into the canal. If the removal of the loose material from along the seams was something more than what was reasonably required of the contractor, . . . the fact remains that it has not been shown that any written protest was made to the doing of it, nor even that defendant ordered it done. With respect to the loose rock and overbreak which defendant directed the contractor to remove, it appears that it was work clearly called for under the specifications."

The court said that the work did not fall within a clause of the contract which provided for increasing or decreasing quantities on a change in the plans as to slope of the walls. The court gave effect to a paragraph in the spex, which said that excavation was to be measured to neat lines for the purpose of payment. Rejecting the contractor's contention that the excavation outside the neat lines should be paid for under the clause providing for changing the wall slopes, the court said:

"The increases or decreases in quantities, which it states will be covered in the estimates, are specified as those which may result from a variation of the slopes of the earth sections or the slopes of embankments and the dimensions dependent thereon. . . . This is true even if we concede, as plaintiff suggests, that the removal of the loose rock liable to fall, from outside the neat lines, has the practical effect of changing the slopes. Except with respect to additional excavation resulting from changes in the slopes, which defendant may decide to make, . . . the specifications expressly restrict the contractor's pay to excavation within the neat lines."

As to the concrete backfill forming part of the concrete base called for by the contract, the court noted that the contractor was apparently satisfied at the time, as shown by the fact that he made no protest. (It is to be remembered that the Government furnished the materials for the concrete.) The court also noted that the contractor's claim rested upon the theory that installation of the concrete below the subgrade constituted a change in the thickness of the foundation, as shown by the plans, within the meaning of a clause of the contract permitting the contracting officer to make such change, in which case the change would be used in measuring payment. The specifications provided for payment for rock backfill at 75 cents a cubic yard and $15 per yard for concrete foundation. The court concluded as follows:

"Neither in the specifications covering excavation . . . nor in those respecting the placing of concrete and the measurement of concrete, is there . . . any indication . . . that the contractor would be required, either without additional compensation, or at the . . . rate for backfill, to install backfilling below the subgrade for headworks structures, ordered by the contracting officer, to replace material not suitable for a foundation, . . . and where the need for such was not attributable to the contractor's careless operation. It is obvious, however, that the backfilling was necessary, whether of gravel or concrete. Apparently the contractor was paid for the excavation, and since he was permitted to use concrete for the backfill he was satisfied at the time."

As to the clause authorizing the contracting officer to change the thickness of the foundation, the court said: "It is obvious that the contracting officer was not concerned with . . . changing the thickness of the concrete base of the headwork structure . . . either when he directed that the soft rock be removed from below the neat lines of the foundation subgrade, or when he permitted concrete to be used for backfill on condition that it "be poured in monoliths with the concrete work immediately above, . . . notwithstanding [the fact that] compliance by the contractor . . . had the effect of increasing the thickness of the concrete structure at those points."

Subcontractor's Status On Government Project

THE PROBLEM: *Subcontracts on a Government housing project provided: "The contractor or subcontractor shall not . . . be held responsible for any loss, damage, detention, or delay caused by the owner or any other subcontractor upon the buildings; or . . . other cause beyond the control of contractor or subcontractor."*

It has been decided by the United States Court of Claims that, under this clause, a contractor cannot recover damages against the Government on behalf of a subcontractor. (Severin v. United States, 99 Ct. Cl. 435 James Stewart & Co. v. United States, 63 Fed. Supp. 653.) Does this rule hold good where the bid-

(Concluded on next page)

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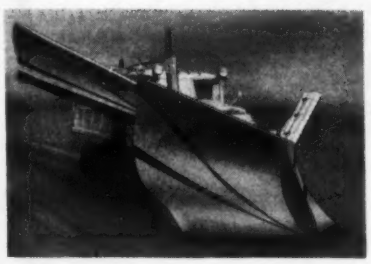

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Avoid Legal Pitfalls

(*Continued from preceding page*)

ding specifications and the contract provide for the approval of subcontracts by the Government's contracting officer; where they make the contractor as much liable for the subcontractors' acts as for his own acts; where they give the contractor the same right to terminate a subcontract as the Government has to terminate the principal contract; and where they provide that nothing in the contract documents shall create a contractual relationship between a subcontractor and the Government?

THE ANSWER: No, decided the Court of Claims by a three-to-two vote of the judges. (Continental Illinois National Bank & Trust Co., Chicago, v. United States, 81 Fed. Supp. 596.)

The court decided that the plaintiff, representing the contractor, could not sue on behalf of subcontractors for damages resulting when the Government caused delays in performance, etc.

The court said that the provisions of the contract requiring the Government's approval of subcontracts, etc., came close to making subcontractors parties to the principal contract, but fell short of doing so. The majority opinion commented: "Since it is now the general custom to sublet various phases of construction to firms who are specially equipped in particular lines, the ends of justice might be better served if a subcontractor were given a right to sue, either in his own name or through the contractor for his benefit, for damages sustained by him on account of wrongful acts of the Government in cases where the letting of subcontractors is approved by the Government. Congress alone, however, has authority, in its discretion, to grant such right."

Two of the five judges who heard the case dissented on the ground that the United States Supreme Court, in effect, reached a contrary conclusion in the case of United States v. Blair, 321 U. S. 730, 88 L. Ed. 1039. In that case the Supreme Court approved a judgement of the Court of Claims in favor of a prime contractor, for losses suffered by a subcontractor because a Government inspector imposed erroneous requirements which increased the subcontractor's labor costs.

It does not appear to what extent, if at all, the contract documents in the case decided by the United States Supreme Court differed in essential wording from those involved in this case. But the Supreme Court did say: "Clearly the subcontractor could not recover this claim in a suit against the United States, for there was no express or implied contract between him and the Government. . . . But it does not follow that respondent [the prime contractor] is barred from suing for this amount. Respondent was the only person legally bound to perform his contract with the Government and he had the undoubted right to recover from the Government the contract price for the . . . work whether that work was performed personally or through another. This necessarily implies the right to recover extra costs and services wrongfully demanded of respondent under the contract, regardless of whether such costs were incurred or such services were performed personally or through a subcontractor."

The dissenting opinion concludes that "the prime contractor" should be "treated in all cases as the owner of a right to have the Government comply with its contract, which right he holds in trust for those whom he brings into the situation by giving them interests in such compliance as subcontractors. Whether or not, in his creation of this trust relation, he expressly makes himself exempt from liability for violation by the Government of the contract should have no effect upon his right . . . to enforce it for the benefit of those harmed by its breach."

Rights When Public Job Is Let Without Bidding

THE PROBLEM: *A state sued contractors for return of excessive payments for public construction work let to them without compliance with a statute requiring competitive bidding. Did the state allege enough facts to entitle it to sue?*

THE ANSWER: Yes. (State of New Hampshire v. Cote, 65 Atl. 2d 280, decided by the New Hampshire Supreme Court.)

The state did not ask that all payments made under the contracts be refunded. It asked merely that there be a judicial determination as to the reasonable value of labor and materials furnished and compulsory refund of any excess of payments above such value. So the court said that it was "unnecessary to consider whether the state might have any greater rights".

The court said that the state's rights depended upon these fundamental legal principles: A statutory requirement for letting of public contracts under competitive bidding is mandatory, being made "to protect the taxpayers from fraud, corruption, and carelessness on the part of public officials and the waste . . . of public funds." Misconception by public contractors that a public officer can let a particular job with competitive bidding will not validate such contracts.

A Subcontractor Wins His Claim for Extra Pay

THE PROBLEM: *A concrete-work subcontractor on a Federal irrigation project claimed extra pay on two counts. He held that the general contractors caused him extra expense by failing properly to make the excavations in which forms were to be installed, and by failing to do preliminary grade work and provide suitable material for forms. Was the subcontractor entitled to extra pay?*

THE ANSWER: Yes. (Continental Casualty Co. v. Schaefer, 173 Fed. 2d 5, decided by United States Court of Appeals, Ninth Circuit.)

The court said that the subcontractor's damages should be measured by the reasonable value of the work and materials furnished, plus overhead and profit, resulting from the general contractors' breach of contract.

It was also decided that the subcontractor sufficiently proved the amount of damage. He produced a statement of costs prepared by a certified public accountant. There was evidence showing what the costs would have been had the work progressed as originally contemplated, and this amount was substantially the same as the amount of the subcontractor's bid; so the increased costs were properly computed by referring to the accountant's statement.

Government Had Burden To Disprove an Agency

THE PROBLEM: *An Army Major approved the furnishing of additional equipment to prime contractors on a War Department cost-plus job. The prime contract specified that the "contracting officer" should include his authorized representative. Did the Government have the burden of disproving the authority of the major to represent the contracting officer?*

THE ANSWER: Yes, decided the United States Court of Claims. (Corum v. United States, 81 Fed. Supp. 728.) The court noted that the major "had represented the contracting officer at all stages of these equipment lease transactions, and if he was not, as he purported to be, the contracting officer's authorized representative to approve these additions to the plaintiff's lease . . . it was the Government's burden to show that he was not. . . . He was the Government man when the transactions . . . occurred, and if the Government thought that he had acted as an imposter in dealing with outside persons, it should have undertaken to prove it."

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Photo shows two American Conveyors in tandem doing this remarkable job for the A. V. Stackhouse Company, Contractors, of Indianapolis, Ind. Contract covered an addition to the Indianapolis Paper Container Co. where concrete was conveyed 35 ft. from truck to pouring point, with an elevation of 22 ft.

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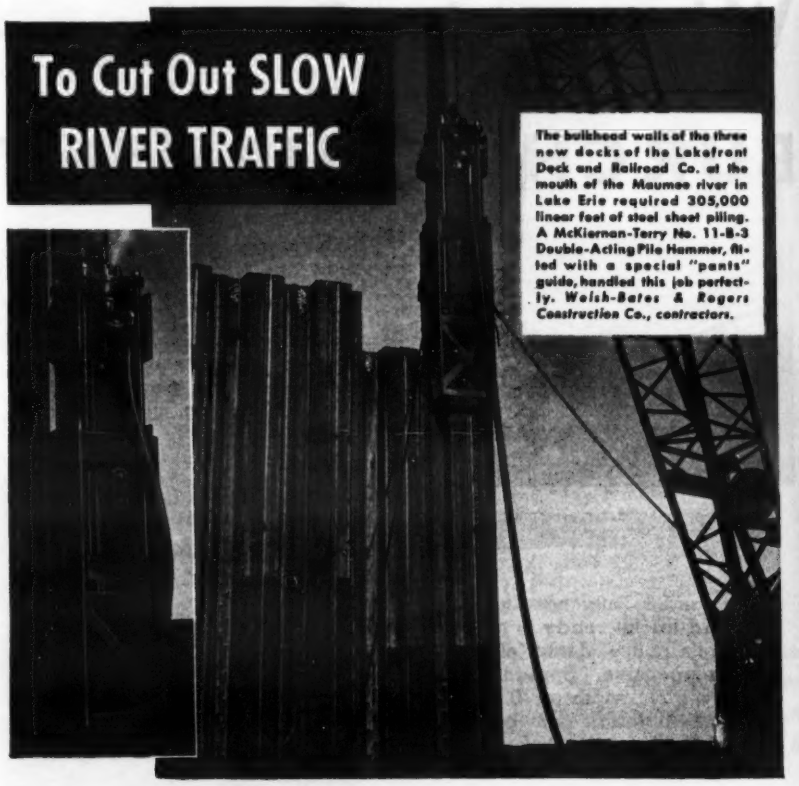

The bulkhead walls of the three new docks of the Lakefront Dock and Railroad Co. at the mouth of the Maumee river in Lake Erie required 305,000 linear feet of steel sheet piling. A McKiernan-Terry No. 11-B-3 Double-Acting Pile Hammer, fitted with a special "pants" guide, handled this job perfectly. *Welsh-Bates & Rogers Construction Co., contractors.*

These long-needed docks enable the lanky lake vessels to pick up coal loads right at the lake front, without the tedious, bridge-hampered trip five to seven miles up the river to Toledo, formerly necessary.

Fitted with a specially designed guide to insure accuracy, this powerful 11-B-3 McKiernan-Terry Hammer, packing a 19,500 foot-pound wallop, was the contractors' natural choice for handling the big steel sheets.

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McKiernan-Terry PILE HAMMERS AND EXTRACTORS

C. & E. M. Photos

On the Clyde grading job, a Carryall is pulled and pushed by D8's (left). Above, a D8-drawn sheepsfoot roller compacts embankment widening next to the old road.

Highway Rebuilt To Scenic Parks

7.6 Miles of Route 89 Between Bryce and Zion Gets a Face-Lifting as Grading Gets Under Way

✦ AN ordinary grading job, without spectacular problems, has improved a part of U. S. Route 89 about 30 miles northeast of Zion National Park, Utah. W. W. Clyde & Co. of Springville, Utah, has a $368,000 contract with the Utah State Road Commission. It calls for grading, drainage, fencing, granular sub-base, and asphaltic-concrete paving.

The ability of tractor-drawn scrapers to operate efficiently in many kinds of material was demonstrated on the project, for there were 30,000 cubic yards of rock to be moved in the 225,000-cubic-yard grading job. Blasted lime rock was loaded and hauled by the Carryalls efficiently enough so that W. W. Clyde, President of W. W. Clyde & Co., decided against moving a power shovel to the job.

While the job is ordinary, its necessity is not. The section now under construction carries almost all the inter-park traffic between Bryce Canyon, Zion Canyon, and Cedar Breaks National Park. Built more than two decades ago to standards of that day, it was no longer adequate to handle modern traffic. It passed through rugged mountainous country approximately 4,000 feet above sea level. Some of the grades were too steep. The curves were sharp. Its road-mixed asphalt-paved surface had long since begun to crack and shove.

The W. W. Clyde & Co. job consists of a general widening of the existing road, with approximately one mile on a new location to eliminate particularly sharp curves. Some of the curves have been flattened to longer radii. Many of the grading cuts consisted of slices made against the sides of the previous ones.

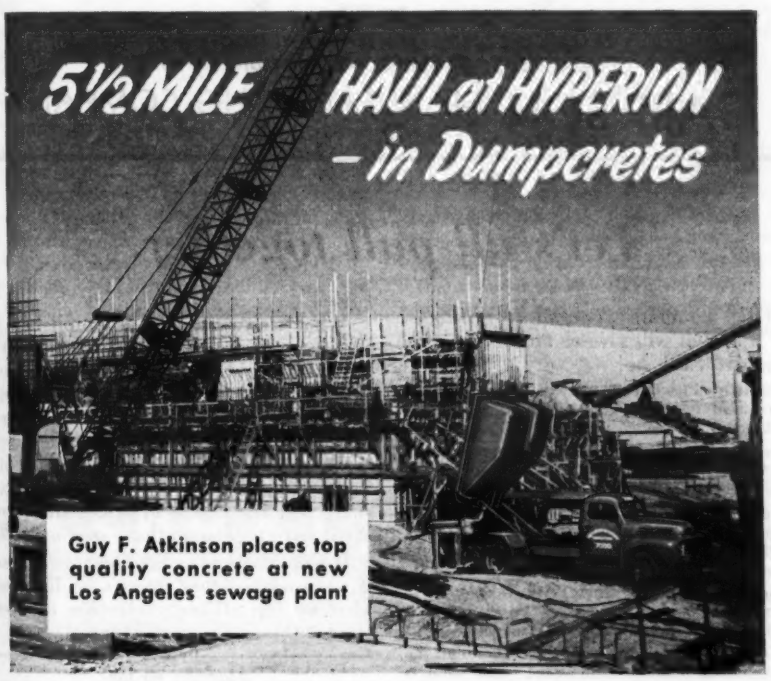
Plans called for a 30-foot-wide earth embankment, with 3-foot shoulders on both edges of the 24-foot asphaltic-concrete surfacing. Fill slopes for embankments are 4 to 1 under 5 feet; 2 to 1 over 5 feet. Cut slopes are 1½ to 1 on the steep slices, with milder slopes of 3 to 1 and 4 to 1 where only a few feet of earth had to be moved.

Selection of Equipment

Yardage was balanced. With the exception of approximately 30,000 cubic yards of lime rock, excavation consisted principally of clay, sand, and gravel. Hauls were all generally under 1,200 feet. Clearly it was a proper assignment for tractor equipment.

Work began October 25, 1948, with the arrival of grading equipment. Six Caterpillar D8's came in. Three of these

(*Continued on next page*)



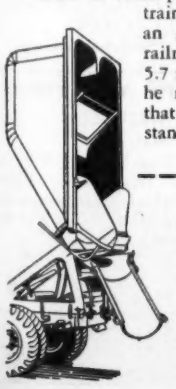
Dumpcretes gave Guy F. Atkinson a low-cost answer to a concrete hauling problem at the new 41-million-dollar Hyperion job.

He wanted to mix at a central plant, where he could produce *uniform* air entrained concrete. He found an ideal site—right on a railroad siding—but it was 5.7 miles from the pour. So he needed a hauling unit that would maintain a constant slump and air content on a haul this long. Dumpcretes were the answer.

Normal hauling time is 20 minutes. But the City of Los Angeles stamped "OK" on his top quality, Dumpcrete-hauled concrete, even after 45 minutes from plant to discharge.

Five Dumpcretes handle the entire production of the 2-yard plant. When pours are held up, they haul sand, so they "earn their pay" every day.

Mail coupon today for *new* booklet on Dumpcrete features — just off the press.



The lower cost Dumpcrete is lightweight, watertight, with 13-foot chute, controlled higher discharge and lower center of gravity. Hauls sand, gravel, and coal too. Available in 2, 3, and 4 yard sizes.

Please send NEW Dumpcrete booklet

Name_____

Firm_____

Address_____

DUMPCRETE

DIVISION, MAXON CONSTRUCTION CO., INC.

552 Talbott Bldg., Dayton 2, Ohio

The New TRIPLEX BACKFILL TAMPER

ONE MAN does a THREE-MAN JOB in 50% LESS TIME

TESTED, PROVED AND IN OPERATION AT

GLEN ULLEN DAM
BONNY DAM
GRAND LAKE-BIG THOMPSON PROJECT
MEDICINE CREEK DAM
ANGUSTORA DAM
PAONIA DAM
CHERRY CREEK DAM

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GUNDERSON-TAYLOR MACHINERY CO.

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970 CHEROKEE STREET • DENVER 4, COLORADO

U. S. SECURITY BONDS are a good investment

BUY THEM REGULARLY

C. & E. M. Photos

On the U. S. Route 89 project in Utah, General Superintendent Blaine Clyde (at the left in the first photo) gives early-morning instructions to driller C. E. Jackson. Next he visits his head powderman, Vern Allen, who is loading Gold Medal explosives for a rock shot. Above, he confers with Resident Engineer Art Terry.

Highway Rebuilt To National Parks

(Continued from preceding page)

machines were still active in May, pulling 18-cubic-yard LeTourneau Carryalls. One, using a Caterpillar bulldozer blade, did miscellaneous push-cat work and leveling. Another did similar work, equipped with a LeTourneau blade. The third spare D8 pulled the two sets of sheepsfoot rollers required by the specifications.

Drilling equipment included a 500-cfm Gardner-Denver air compressor, a Gardner-Denver wagon drill, and several smaller pneumatic drills handled by one man. Timken steel and rock bits were used.

The rock cuts were completed by spring. They consisted of a lime formation just hard enough to require explosives. The rock was not hard enough to dull drill bits appreciably, and drillers put down one hole after another without having to change bits very often. The initial shipment of bits lasted throughout the job without resharpening.

Holes were drilled generally on 6-foot centers, and on the work late in 1948 they were sprung heavily. Gold Medal 40 per cent bag and stick powder was used, with electric blasting caps.

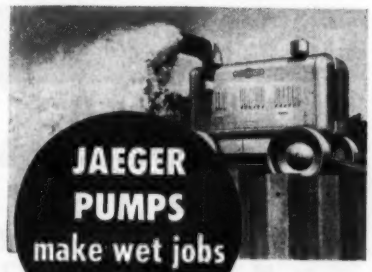
Earth-Moving Methods

Earth-moving methods were more or less routine, consisting of a never-ending jigsaw of daily moves and problems. The equipment fleet stayed with one cut or fill until it completed the work; then moved on to the next. It was about as simple as that—provided, of course, each machine ran steadily at its peak efficiency, all of which added up to a problem of varying importance.

As the Carryalls dumped the earth in fills, a bulldozer blade leveled it off and the sheepsfoot roller went to work. Late in 1948 the earth was dry, so some water had to be hauled. Winter snows put a great deal of moisture in the ground before work resumed this spring, and the material had approximately the right moisture content. Em-

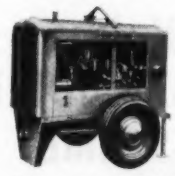
(Concluded on next page, Col. 2)

New 2" aluminum pump weighs 105 lbs., pumps 9000 gph . . . Gives high head performance for price of low head pump.



JAEGER PUMPS make wet jobs dry

Extra power and double priming action to dewater faster. Built to outlast cheaper pumps by thousands of hours.



Heavy duty 2" to 10" models for low or high head requirements. Super-Jet pumps for pressures to 275 lbs. Diaphragm and caisson pumps. Get catalog.

THE JAEGER MACHINE COMPANY
Columbus 16, Ohio

GARRISON HYDRAULIC POWER STEERING INSTALLED ON NEW 100-HP No. 12 CATERPILLAR MOTOR GRADER

- Reduces steering effort to easy one-hand operation.
- Wheel fight and road shock eliminated.
- Mechanical steering in effect with hydraulic assistance.
- Easily installed in the field.

• *Available in kits. Also for 75 H.P. #12 Graders*

CONTACT YOUR DEALER OR WRITE DIRECT TO

GARRISON MANUFACTURING COMPANY
1506 Santa Fe Ave., Los Angeles 21, Calif.

DAREX AEA

For high quality air-entrained concrete —backed by a competent engineering field service readily available from your distributor.

DEWEY AND ALMY CHEMICAL COMPANY
CAMBRIDGE 40, MASS.

Let's all pull together!

LET'S compare *yesterday* with *today* . . . that will give us an idea of what tomorrow can be!

Machine Power: Since 1910 we have increased our supply of machine power 4½ *times.*

Production: Since 1910 we have more than *doubled* the output each of us produces for every hour we work.

Income: Since 1910 we have increased our annual income from less than $2400 per household to about $4000 (in dollars of the same purchasing power).

Work Hours: Yet, since 1910 we have cut 18 hours from our average workweek—equivalent to two present average workdays.

HOW have we achieved all this? Through the American kind of teamwork! And what is *teamwork?*

American teamwork is management that pays reasonable wages and takes fair profits—that provides the best machines, tools, materials and working conditions it possibly can—that seeks new methods, new markets, new ideas; that bargains freely and fairly with its employees.

Our teamwork is labor that produces as efficiently and as much as it can—that realizes its standard of living ultimately depends upon how much America produces—that expects better wages as it helps increase that production.

Teamwork is simply working together to turn out more goods in fewer man-hours—making things at lower costs and paying higher wages to the people who make them and selling them at lower prices to the people who use them.

What we've already accomplished is just a foretaste of what we *can* do. It's just a start toward a goal we are all striving to reach: better housing, clothing, food, health, education, with ever greater opportunities for individual development. Sure, our American System has its faults. We all know that. We still have sharp ups and downs in prices and jobs. We'll have to change that—*and we will!*

It will continue to take *teamwork,* but if we work together, there's no limit on what we can all *share together* of even greater things.

Approved for the
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by:
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Executive Director, Twentieth Century Fund
BORIS SHISHKIN
Economist, American Federation of Labor
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Formerly President, Studebaker Corp.

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11 West 42nd Street, New York 18, N.Y.
Please send me your free booklet, "The Miracle of America," which explains clearly and simply, how a still better living can be had for all, if we all work together.

Name ----------

Address ----------

Occupation ----------

To enable each construction executive and foreman to become his own weather prophet, a new, pocket-size weather guide manufactured by American Optical Co. automatically makes forecasts based on cloud formations and wind.

Guide Helps Predict Weather for 24 Hours

To enable any construction man to become his own weather forecaster, a new pocket-size weather guide automatically makes predictions based on cloud formations and wind directions. According to the manufacturer, the American Optical Co. of Southbridge, Mass., operation of the device requires no special skill.

Two simple steps are necessary to figure out weather conditions for the next 24-hour period, the company states. Direction of the wind is noted and local clouds are matched with one of seven pictures of cloud formations on the face of the instrument. When a dial is turned to align a red arrow with the wind direction, the weather prediction appears in a little window on the guide.

War-born forecasting techniques and data gained from 50 years of daily weather charts for the entire Northern Hemisphere were used, it is said, to develop the device. The data brought out fundamental relationships between coming weather and each combination of clouds and wind direction.

The weather guide was developed by Dr. Irving P. Krick, President of the American Institute of Aerological Research, and for 15 years active head of the Meterological Department of the California Institute of Technology. During World War II, he served as Deputy Director of Weather Services and Chief of the Weather Information Section, U. S. Strategic Air Forces in the European Theater.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 110.

Highway Rebuilt To National Parks

(*Continued from preceding page*)

bankment fills developed 98 per cent of optimum density under the action of the sheepsfoot rollers.

Most of the cut sloping was done by a Caterpillar No. 12 motor grader, with here and there, where the cuts were thin, some hand grading. One particularly narrow cut shelf hardly contained room for the Carryalls to pass through, so if a motor grader did the sloping there, inevitable delay would result.

Grading started on a single-shift basis, but as soon as summer arrived, operations were stepped up to a double 8-hour shift each day, 6 days a week. The crusher soon arrived to produce the granular sub-base and the stockpiles of material which will be left behind for maintenance crews after the job is finished. Still later, a Cedarapids 2,000-pound asphalt plant was shipped down to mix mineral aggregate and 200 to 300-penetration asphaltic cement for the pavement. The organization hopes to finish the job before winter.

A camp site near the center of the job contains a cook house, tents, and equipment service facilities. The latter is geared principally to the routine service of machines each day, with fuel and lubricants, and the replacement of parts which occasionally fail.

Blaine P. Clyde, son of W. W. Clyde, is General Superintendent on the job, and Art Terry is Resident Engineer.

Handbook on Timber

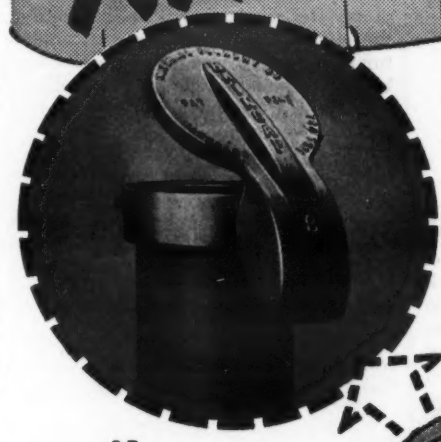
Research work of the past 10 years done by forestry and lumber organizations has been compiled in the "Timber Engineers' Handbook" by Howard J. Hansen, Professor of Mechanics, University of Florida. It contains the latest information needed for the design of wood structures—including the properties of wood, grading specifications, working stresses, preservatives, fastenings, design formulae, and method of design. The work covers all timber used in this country.

"Timber Engineers' Handbook", 882 pages long, is published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y. The price of the book is $10.00.

LaPlant-Choate Sales Mgr.

The appointment of J. W. Schoen to the position of Sales Manager was recently announced by LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa. Mr. Schoen replaces E. R. Galvin who has resigned. He has been with the company since 1943.

RAINCAP



STOPS MOISTURE FROM FALLING INTO TRACTOR EXHAUST . . . Just slip the "RAINCAP" over the open end of your tractor exhaust, and you eliminate forever the danger of moisture falling into the exhaust, injuring your tractor.

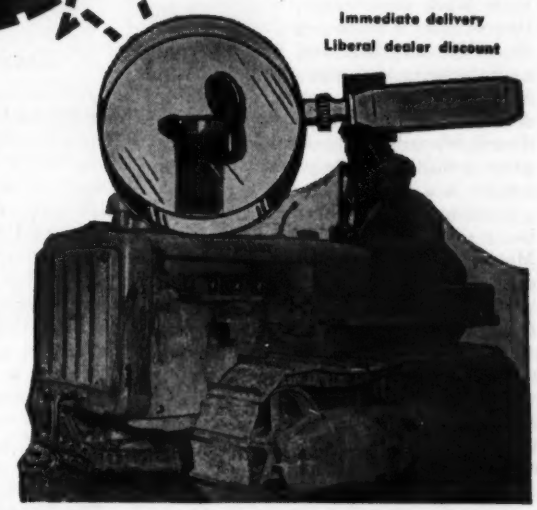
THE CAP THAT DOES NOT FORGET TO CLOSE . . . Completely automatic—the "RAINCAP" is counter-balanced to open when the tractor starts and close when it stops. Rust proof—made of cast aluminum with bronze bushing—can be installed in two minutes. F.O.B. Waterloo, Iowa.

Write Dept. C-1

Immediate delivery

Liberal dealer discount

No.	O.D. Exhaust	Retail
1	2⅜"	$1.90
2	2⅝"	1.90
3	2¾"	1.90
5	1⅞"	1.90
55	2"	1.90
5x	1¾"	1.90
6	1½"	1.90
66	1⅜"	1.90
7	2½"	1.90
8	3"	2.50
9	3⅛"	2.50
10	3¼"	2.50
11	3½"	2.75
115	3¾"	3.00
12	4"	3.00
123	4⅛"	3.00
125	4¼"	3.00
14	4½"	3.00



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CUMMER ASPHALT PLANTS

COMPLETE PLANTS FROM 45 TO 100 TONS PER HOUR

PROMPT SHIPMENT ON ALL SIZES

FEEDERS, STORAGE BINS PUMPS - TIMERS AND OTHER UNITS AS REQUESTED

LITERATURE UPON REQUEST

CUMMER NEW PORTABLE DRYER

—45 TO 55 TONS PER HOUR HOT MIX—

FURNISHED COMPLETE WITH INDIVIDUAL MOTOR DRIVES, AND WITH ENCLOSED COLD ELEVATOR, FAN AND BURNERS (EITHER HIGH OR LOW PRESSURE).

CAN BE FURNISHED WITHOUT WHEELS AND AXLES.

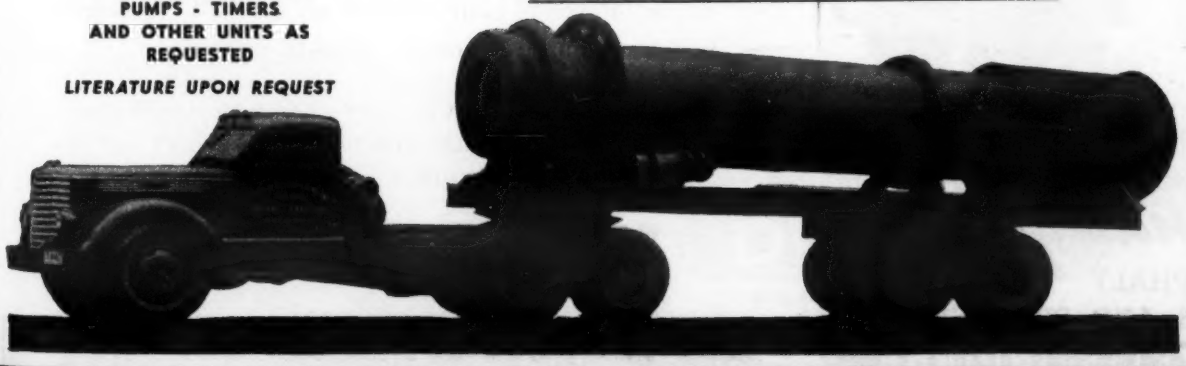
COMPLETE TOWER UNITS, VIBRATING SCREENS, HOT ELEVATOR AND BINS, FURNISHED WITH DRYER IF DESIRED.

LARGER SIZES 80 TO 100 TONS PER HOUR (COMPLETE DRYING AND MIXING UNITS) ALSO AVAILABLE

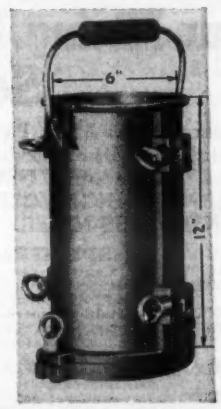
THE F. D. CUMMER & SON COMPANY

BUILDER OF FINE ASPHALT PLANTS

CLEVELAND 15, OHIO USA



MOLINE CONCRETE TEST CYLINDER MOLD



For concrete samples of exact measurement. Made of refined malleable iron, accurately machined, with bronze wing nuts and swing bolts.

MOLINE IRON WORKS

MOLINE, ILLINOIS, U.S.A.

Seventy Years of Service

Leaving New York City on a five-month tour of the United States and Canada with Mack's mobile diesel-engine exhibit, A. G. Crockett, tour manager and lecturer, receives the good wishes of A. C. Fetzer, Vice President and General Sales Manager of Mack Trucks, Inc.

Diesel-Engine Show On Nationwide Tour

To present its new line of diesel engines to truck operators, Mack Trucks, Inc., New York City, has launched a mobile exhibit on a five-month nationwide tour. Housed in an eye-catching colored semi-trailer pulled by a Mack diesel-powered tractor are the company's three new diesel engines, the END 457, 510, and 672. The only manufacturer to design and build diesel engines exclusively for its own line of chassis, Mack is directing these three diesels towards tractor-trailer combinations of 40,000 pounds gross combination weight and up.

In charge of this barnstorming show is A. G. Crockett, Mack's Director of Market Research, who will put on a comprehensive demonstration for invited audiences. His talk entitled "Can I Use Diesels?" will be illustrated with charts and slides and will conclude with a question-and-answer period. The talk will cover the functions of a diesel, how it differs from a gasoline engine, its performance, its first cost, fuel costs, mileage, taxes, maintenance, etc.

To haul its exhibit on the first lap, the company is using one of its Model EHT tractors powered by an END 457 diesel engine. Later in the tour this will be replaced by a Mack EQT tractor powered by an END 510 diesel. The complete trailer-tractor unit is 44 feet long and is expected to attain a speed of 60 mph on the road.

Displayed in the trailer is an END 672 exploded working diesel engine; an END 457 complete as it comes off the production line; a working model of the Mack Mono-shift transmission to show the speed and grade ability of the EQT diesel-powered tractor with overgeared transmission; and a panel with cut-away sections of the complete Mack diesel fuel-injection system.

Low-Height Pump

A completely submergible sump pump, the P-109, is announced by Kenco, Inc., 159 Ridge St., Elyria, Ohio. Powered by a ⅓-hp 115-volt ac motor, the pump is rated at 3,300 gpm under a 10-foot head. All its exposed surfaces are of durable bronze construction. It is a low-height unit, 9½ inches high and 11 inches in diameter, and it weighs 45 pounds.

The company claims it is the first pump designed to run a sump dry, thereby eliminating stagnant water. The turn-on point, or height of water which is required to start the pump, is adjustable from a few inches to several feet, without special tools.

The diaphragm switch has no moving parts exposed to water and the pump switch does not require a float. Pressure of rising water actuates the switch which is located in the discharge line, and subsequent pumping keeps it in operation. The switch automatically shuts off when the pump draws air.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 120.

Steel Tunnel Liners

A 38-page booklet, "Commercial Steel Liner Plates", is available from The Commercial Shearing & Stamping Co., 1775 Logan Blvd., Youngstown 1, Ohio. It describes the use of liner plates for caissons, shafts, and overcasts; and for water, sewer, railroad, service, and highway tunnels.

The booklet points out that Commercial liner plates may be used for all of the various ground conditions likely to be met in tunneling operations, and that they are suitable for all sizes and styles of tunnels. They serve as temporary or permanent linings in tunnels, roof protection in rock excavation, and permanent or temporary caisson or shaft lining.

The literature describes in detail the methods of construction used for needle-beam, flying-arch, or poling operations. On-the-job photographs and engineering drawings illustrate the text.

The booklet is available to designers and contractors interested in this type of work. It may be obtained from the company, or by using the Request Card at page 16. Circle No. 27.

Power Wheelbarrows

A new catalog issued by Kwik-Mix Co., Port Washington, Wis., describes the Moto-Bug power wheelbarrow. Driven by a standard 4-hp gasoline engine, the Moto-Bug travels at speeds of 2 to 4 mph both forward and reverse. It has a rated hopper capacity of 10 cubic feet or 1,200 pounds on the platform body. Photographs illustrate the unit's attachments and its applications in construction.

This literature may be secured from the company, or by using the Request Card at page 16. Circle No. 117.

"I BOUGHT ANTHONY DUMP BODIES— —THEY COST ME LESS"

Contractors everywhere are buying where they can do the best. As one contractor recently remarked:

"After weighing all of today's factors of price, quality and performance I bought Anthony Dump Bodies and Hoists - - - they cost me less."

For prices on equipment to meet your specifications it will pay you to call your Anthony distributor. Write for name of dealer nearest you. Quick delivery from stock.

ANTHONY HYDRAULIC

ANTHONY CO. - - Streator, Ill.

SPREADING UP TO 150 TONS PER HOUR

OF COURSE IT'S AN

APSCO BASE PAVER

Think of it! a two-man crew and this paver can lay up to 150 tons per hour. You can lay more stone—faster. Paver is easily loaded on carryall. Changing width or depth is simple—quickly done.

Handles 8′ to 12′ widths—up to 12″ deep. Oscillating screed—dual steering—hydraulic brakes—high speed reverse. Forms not usually required.

Write for complete specifications and delivery—now!

ALL PURPOSE SPREADER CO. Wyrie, Ohio U.S.A.

Your Mixing Problem Solved:—

Bituminous Pre-Mix Paving Materials can be produced with EASE in this NEW—HIGH SPEED—HIGH VOLUME —CONTINUOUS MIXER.

MODEL JR

SPECIFICATIONS

CAPACITY:	Up to one ton per minute
POWER:	Wisconsin or Equal Gasoline Engine 12 H.P. Air-cooled
PROPORTIONING:	Variable volume Rotor feed for aggregate. Variable volume pump with micrometer manual control for asphalt
MOUNTING:	Trailer mounted with tow bar and standing support
MIXER:	Triple mixing shaft 12" wide operated at 150 to 250 R.P.M.

Write: McConnaughay

EMULSIFIED ASPHALT PLANTS AND PROCESSES

WEST LAFAYETTE, INDIANA

New Brake Designed For Excavator Units

An airplane-type single-disk brake is being designed as an auxiliary brake for heavy earth-moving units, by engineers of Goodyear Tire & Rubber Co., Akron 16, Ohio. The company reports that down-time and maintenance costs have been cut appreciably wherever the brake has been used.

This non-self-energizing brake is said by Goodyear technicians to give soft-cushion instead of quick-grabbing brake action. They also state that the brake has a straight-line torque curve throughout the braking range and gives equal torque in both directions; that it is simply constructed, easy to reline or replace, and self-adjusting over the entire life of the lining.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 74.

Earth-Moving Equipment: Clearing to Final Grade

A new 16-page booklet called "Slope Stake to Final Grade With Caterpillar Equipment" has recently been issued by Caterpillar Tractor Co., Peoria 8, Ill. It shows Caterpillar machines pioneering, clearing, starting the cut, loading, hauling, backfilling, grading, etc. It highlights cut-and-fill operations with tractor-scraper teams. And it includes additional material on Caterpillar power units adapted for draglines and shovels, compressors, rollers, loaders, and crushers.

"Saving Tax Dollars With Caterpillar Equipment", a 16-page catalog, is also available for those users of equipment concerned with public works. The booklet contains specifications on diesel engines, tractors, electric sets, motor graders, bulldozers, rippers, and scrapers.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 65 for the first catalog and No. 66 for the second.

Lincoln Sales Engineering; Staff Changes, Additions

E. S. Goehringer has assumed sales and engineering responsibility in the Indianapolis area as District Manager of the Lincoln Electric Co., with offices at 3343 Central Ave., Indianapolis, Ind. Omer Blodgett has been transferred to the Lincoln Chicago office at 2450 S. Prairie St. In addition to his duties as Sales Engineer, Mr. Blodgett has a special assignment on engineering applications for redesigning to welded steel fabrication.

Two new District Engineers, R. L. Hall and Robert Hirsch, have been assigned to the office at 22 Wabash St., Pittsburgh, Pa.

Piling Rental Service

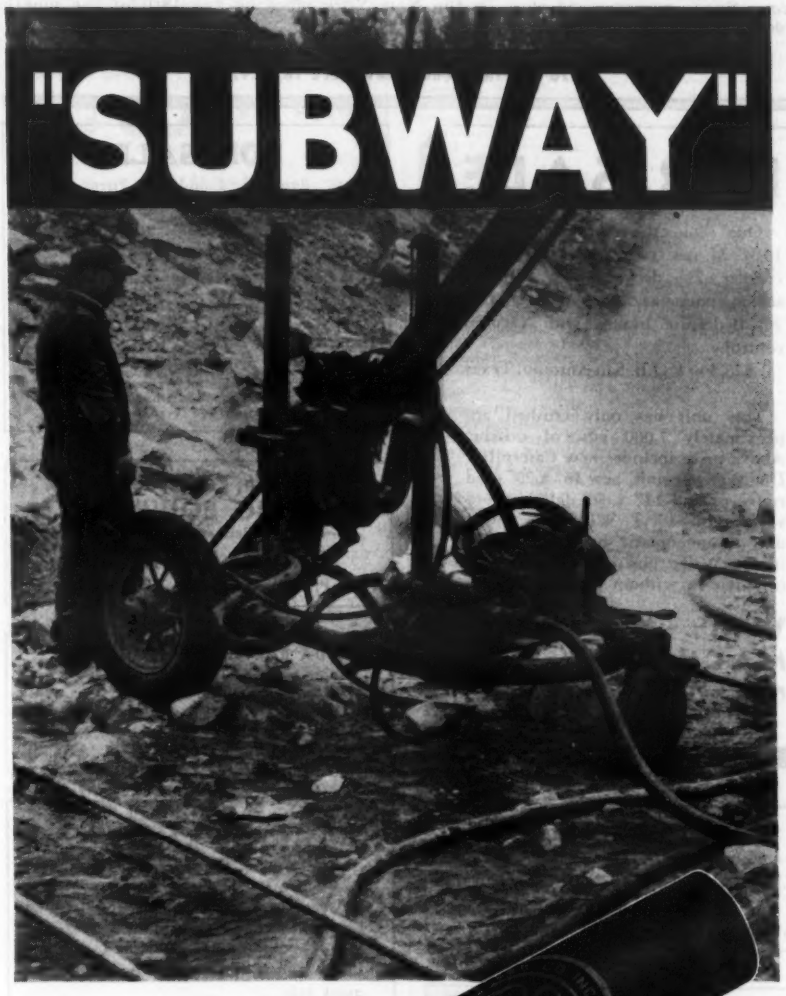
A 4-page two-color folder featuring a rental service for interlocking sheet piling has been issued by the L. B. Foster Co., P. O. Box 1647, Pittsburgh 30, Pa. Catalog No. F120 3-49 is addressed to contractors and lists five features of the pile rental service. All standard sections and corrugated-steel sheet piling are available, as well as pile hammers and extractors.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 85.

Hyster Boosts Morgan

J. W. Morgan has been advanced to the position of Assistant Sales Manager of the Hyster Co.'s eastern sales division. He will be in charge of tractor-equipment sales and will be located at the plant in Peoria, Ill.

"SUBWAY"



For Profitable Drilling!

A "Standard of Quality" Product, in sizes from ½" to 1¼", maximum lengths of fifty feet. Wrapped duck construction.

Strong, tough, reliable . . . to keep heavy-duty air tools on the job longer. Balanced construction assures equally long life for tube, carcass and cover . . . a big saving in hose replacement costs. Very flexible and comparatively light in weight, for easy handling.

Prompt Delivery to Your Job From a Nearby Goodall Branch

GOODALL RUBBER COMPANY

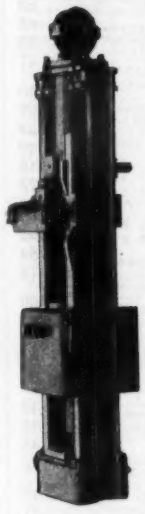
GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.

Branches: Philadelphia • New York • Boston • Pittsburgh • Chicago • St. Paul • Los Angeles
San Francisco • Seattle • Salt Lake City • Denver • Houston • Distributors in Other Principal Cities

Est. 1870

IT TAKES IMPACT TO PUT 'EM DOWN

WARRINGTON-VULCAN
Single-Acting Steam
PILE HAMMERS



Applied power is the key to efficient, economical pile driving . . . power as applied by the Warrington-Vulcan Single-Acting Steam Pile Hammer.

Telling, low velocity blows from a relatively heavy ram give you speed and savings in putting 'em down. You get easy, economical operation through the Warrington - Vulcan's sturdy construction and simple design, with working parts exposed for ready accessibility. You get results through its rapid, regular and continuous action, operating at a medium steam pressure. Costs reach rock bottom, right along with whatever kind of pile you're driving—wood, steel or concrete.

• Write for full information on the Single-Acting Warrington-Vulcan . . . proved on the tough jobs since 1887.

VULCAN IRON WORKS
Since 1852
329 North Bell Avenue
Chicago 12 ---Illinois

SPECIFY STRAIGHT FRAME CONSTRUCTION
for
ALL-WEATHER "STRAIGHT THROUGH" SERVICE

Duplex Straight Frame Construction means much easier, much more dependable plow and scraper mounting!

DUPLEX
TRUCK COMPANY
LANSING 4, MICHIGAN
PROTECTED DEALER FRANCHISES AVAILABLE IN SOME AREAS

KEEP INFORMED—

•

For further information and literature on products described in this issue, turn to page 16 for the Red Request Card. Our Reader Service Department will be glad to help you.

•

Contractors and Engineers Monthly
470 Fourth Ave.
NEW YORK 16, N. Y.

Index to New Products And Catalogs

Described in this issue

Absorbent, Oil and Grease 24
Adapters, Tailboard 67
Aggregate and Gravel Plants 74
Anti-Freeze, Air-Line 25
Asphalt Plants 51, 90
Augers, Earth 75

Bars, Reinforcing 23
Belting, V-Type 32
Blasting Effects 66
Blocks, Snatch 27
Bodies, Dump 77
Brakes, Excavator 97
Breakers, Pavement 60
Bridges, Composite-Deck 31
Buckets, Clamshell 74
Buildings, Steel 65
Bulldozers 23

Cabs, Tractors 17
Canvas, Flameproof 26
Cleaners, Equipment 39
Coatings, Protective 9
Compounds, Concrete Curing 46, 79
Compressors, Air 38, 78
Concrete Testing Equipment 89
Controls, Spreader-Gate 65
Conveyors, Belt 59
Crushers 39, 47

Derricks 46
Dirt-Movers 97
Distributors, Bituminous 38
Drainage Structures 40
Drills, Core 46
Drivers, Stud 78

Electric Plants 65
Engines, Diesel 73, 84, 90
Engines, Gasoline 60, 84
Excavators 55, 78

Fasteners, Form Lining 60
Feeders 35, 49
Flares, Electric 79
Floats, Concrete 84
Forms, Concrete 26, 46, 68

Generators, Steam 49
Gloves, Work 31
Graders 35, 48
Grouser Retreading 66

Hoists and Winches 46
Hoists, Hydraulic 77
Hoists, Material 25

Joints, Universal 46

Kettles, Heating 47

Lathe Converters 79
Liner Plates, Tunnel 96
Loaders, Front-End 84
Lubricants 9

Maintainers 25
Markers, Highway 49
Meters, Grade and Slope 59
Mixers, Concrete 17, 46
Mixers, Mortar and Plaster 59

Pavers, Concrete 84
Payroll Systems 83
Piles, Concrete 74
Piling, Sheet 97
Pipe Threaders 88
Planers, Road 68
Pumps 17, 35, 96

Radio Equipment 9, 66
Rollers 32, 47
Rubber Products 78

Safety Equipment 84
Salt, Rock 29
Saws 49, 74, 83
Saws, Masonry 32
Scaffolding 88
Scrapers, Dirt-Moving 39
Service Trucks 87
Slide Rules 55
Snow Removal Equipment 10, 25, 26, 31, 47, 54, 78
Spreaders, Asphalt and Stone 23, 87
Spreaders, Sand 27, 47
Sprockets, Gear 67
Stripers, Traffic 79, 89
Surfacing, Floor 88
Surveying Equipment 9
Sweepers, Magnetic 73

Taglines 50
Tanks, Prestressed Concrete 88
Tape, Measuring 61
Tools, Equipment Repair 29
Tractors, Crawler 10
Trailers 59
Transmissions, Auxiliary 73
Trucks, Motor 30
Tubing, Flexible 35

Vacuum Concrete 75
Vibrators 17, 59

Washing Plants, Aggregate 27
Weather Guide 95
Welding Supplies 17, 49, 54, 82
Wheelbarrows and Carts 35, 50, 96

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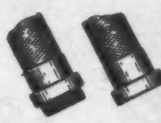

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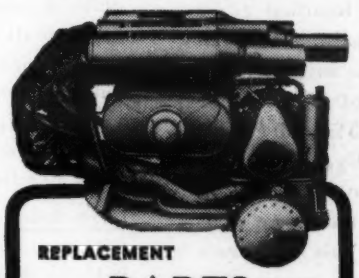

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Index to Advertisers

Aeroil Products Co. 35
Air Reduction Sales Co. 70
Allied Steel Products, Inc. 48
Allis-Chalmers Tractor Div. 50, 51
All-Purpose Spreader Co. 96
American Conveyor Co. 92
American Cyanamid Co. 7
American Floor Surfacing Machine Co. 23
American Hoist & Derrick Co. 91
American Manganese Steel Div. 40
American Steel Scraper Co. 33
Anthony Co. 98
Ariens Co. 43
Athey Products Corp. 72
Austin-Western Co. 61

Barber-Greene Co. 81
Beaver Art Metal Corp. 68
Bethlehem Steel Co. 79
Bicknell Manufacturing Co. 82
Bitucote Products Div. 88
Blaw-Knox Div. 59
Briggs & Stratton Corp. 38
Bucyrus-Erie Co. 67
Burch Corp. 91

Caine Steel Co. 34
Carter Co., Ralph B. 66
Caterpillar Tractor Co. 8, 9
Champion Wheelbarrow Co. 85
Chevrolet Motor Div. GMC 28
Chicago Pneumatic Tool Co. 28, 29
Chrysler Corp., Industrial Engine Div. 45
Cleveland Trencher Co. 52
Complete Machinery & Equipment Co., Inc. 66
Concrete Surfacing Machinery Co. 69
Concrete Transport Mixer Co., Inc. 67
Construction Machinery Companies 89
Cummer & Son Co., F.D. 95

Dallett Co. 26
Davenport Besler Corp. 17
Davey Compressor Co. 89
Detroit Diesel Engine Div. GMC 48
Dewey & Almy Chemical Co. 94
Dixon Valve & Coupling Co. 68
Downs Crane & Hoist Co. 55
Drake-Williams-Mount 77
Duplex Truck Co. 97

Eagle Crusher Co., Inc. 78
Eaton Mfg. Co. 44
Electric Tamper & Equipment Co. 33
Electroline Co. 82
Embury Mfg. Co. 62
Ennis Supply Co. 52
Erie Steel Construction Co. 89

Fastener Corp. 65
Federal Motor Truck Co. 5
Fisher Research Laboratory, Inc. 14
Flexible Steel Lacing Co. 70
Florida Land Clearing Equipment Co. 14
Foote Co., Inc. 31
Ford Motor Co. 41
Fuller Manufacturing Co. 35

Gar-Bro Mfg. Co. 22
Garrison Mfg. Co. 94
Gatke Corp. 77
General Wheelbarrow Co., Inc. 88
Gledhill Road Machinery Co. 84
GMC Truck & Coach Div. 32
Gold Foundry & Machine Works 83
Goodall Rubber Co., Inc. 97
Good Roads Machinery Corp. 30
Griffin Wellpoint Corp. 41
Gunderson-Taylor Machinery Co. 93

Haiss Mfg. Co., Inc., George 54
Hayward Co. 15
Hendrix Mfg. Co., Inc. 34
Hetherington & Berner Inc. 64
Huber Mfg. Co. 68

Ingersoll-Rand Co. 65
International Harvester Co. 46, 47
Iowa Mfg. Co. 24, 25
Irvington Form & Tank Corp. 82

Jackson Mfg. Co. 77
Jaeger Machine Co. 44, 96
Johnson Co., C.S. 37
Joy Mfg. Co. 43

Kim Hotstart Mfg. Co. 86
Kinney Mfg. Co. 92
Koehring Co. 36, 37
Kwik-Mix Co. 37

LaCrosse Trailer Corp. 83
LeTourneau Inc., R.G. 100
Littleford Bros., Inc. 86
Lombard Governor Corp. 63

Mack Trucks, Inc. 49
Maginnis Power Tool Co. 81
Marion Metal Products Co. 84
Martin Machine Co. 78
Maxon Construction Co., Inc. 93
McConnaughay, K.E. 96
McCulloch Motors Corp. 16
McKiernan-Terry Corp. 92
Mechanics Universal Joint Div. 83
Messenger, Frank D. 7
Miller Research Engineers, Ray 78
Minneapolis-Moline 85
Miracle Decal Co. 98
Moline Iron Works 95
Monarch Road Machinery Co. 74
Mulkey Co., Sam 86

New Holland Mfg. Co. 63
Northfield Iron Co. 90

Oliver Corp. 57
Owen Bucket Co. 90

Page Engineering Co. 27
Parsons Co. 37
Pettibone Mulliken Corp. 54
Powder-Power Tool Corp. 80
Pre-Con, Inc. 33

"Quick-Way" Truck Shovel Co. 42

Reed-Prentice Corp. 10
Rex Machine Co. 49
Richmond Screw Anchor Co., Inc. 84
Riddell Corp., W.A. 85
Rockford Clutch Division 89
Roebling's Sons Co., John A. 17
Roeth Vibrator Co. 73
Rogers Brothers Corp. 88
Rosco Mfg. Co. 32
Rotary Concrete Drill Co. 87
R.P.B. Corp. 58

Saagen Derrick Co. 85
Schield Bantam Co., Inc. 60
Schramm Inc. 62
Serviceaid Products Corp. 64
Sinclair Refining Co. 20, 21
Small Equipment Co. 87
Smith Engineering Works 56
Soil Mover Co. 83
Southwest Welding & Mfg. Co. 35
Standard Oil Co. (Indiana) 71
Sta-Vis Oil Co. 10
Sterling Machinery Corp. 11
Steody Co. 39
Stulz-Sickles Co. 68
Symons Clamp & Mfg. Co. 54

Tel-E-Lect Products, Inc. 42
Texas Co. 3, 12, 13
Thew Shovel Co. 11
Thurman Machine Co. 38
Transport Trailers, Inc. 52
Tuthill Spring Co. 83

U-C Lite Mfg. Co. 16
Universal Engineering Corp. 73
Universal Form Clamp Co. 31

Van Dorn Electric Tool Co. 73
Viber Co. 22
Vibro-Plus Products, Inc. 72
Vulcan Iron Works 97
Vulcan Tool Mfg. Co. 81

Walter Motor Truck Co. 69
Warren-Knight Co. 27
Waterloo Foundry Co. 95
Waukesha Motor Co. 40
Wellman Engineering Co. 86
Wellman Co., S.K. 58
White Mfg. Co. 95
Wickwire Spencer Steel Div. 75
Williams Form Engineering Corp. 40
Winch-Lift Inc. 15
Winslow Scale Co. 60
Wisconsin Motor Corp. 80
Wood Mfg. Co. 78, 87

Yaun Dragline Buckets & Mfg. Plant 74

Ziegler Co., Inc., Wm. H. 71

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Chippewa County sets fast pace on road relocation with 3 D ROADSTERS

25 m.p.h., rubber-tired ROADSTER fleet moves 126 yards an hour on 3200' haul

Flowage area, created by a power company dam, recently made it necessary to relocate Highway M in Chippewa County, Wisconsin. Excavation for the new route totaled approximately 100,000 cu. yds. . . . most of it abrasive glacial sand. Chippewa County Highway Commissioner W. H. Taylor decided it was a job for the 25 m.p.h. speed of their rubber-tired D Roadsters . . . put a fleet of 3 "D's" to work . . . and got the following results:

6400' cycle every 8 min.

By using a pusher to load, each Roadster picked up 6 pay yards of sand in 42 seconds . . . hauled 3200 feet to the fill . . . spread in 18 seconds, and returned to cut in a total cycle time of 8 minutes. Through these high-speed cycles, the Roadster fleet averaged 126 pay yards an hour, total for the three units. Over the duration of the job, this big-production ability enabled the three 100 h.p. "D's" to handle 75,000 cu. yds., while two 93 h.p. crawler tractors with 8-yard scrapers handled only 25,000 yards.

"D" handles 50% more per machine than crawler

In other words, each Roadster, with its faster speed on rubber, handled *twice* as much yardage per machine as each crawler-scraper . . . and the savings don't stop there. Initial cost of the crawler outfit is approximately 15% *more* than the D Roadster. Basically, this high-speed "D" is a one-man, self-loading tool for odd-lot, maintenance-type dirtmoving . . . but jobs like this Chippewa County highway relocation prove that Roadster also earns substantial savings in fleet operation with a pusher on production work.

Consider what these savings can mean on *your* dirtmoving. Get all the facts . . . write, or ask your LeTourneau Distributor about 25 m.p.h. D Roadsters TODAY!

Check these quick facts on why D ROADSTER gets more jobs done...

All-weather tool . . . Patented "torque-proportioning" differential, plus positive power steer, give sure-footed traction for pulling through sand, mud holes, and for getting on and off soft, wet fills. 14.00 x 32 tires (18.00 x 25 optional) provide traction and flotation.

Self-loads in all good scraper materials . . . 100 h.p. Roadster does one-man dirtmoving on scattered assignments . . . yet its 7-yard (9-ton) capacity is big enough for fleet use with a pusher on bigger production jobs.

Drives anywhere . . . Works, travels over pavement . . . moves job-to-job at speeds to 25 m.p.h. No waiting for trailer, no loading delays, no blocking . . . just hop on and GO. Sure-acting, 4-wheel air brakes (3184 sq. in. braking surface) let operator use top speeds with complete confidence and safety.

Has multiple uses . . . "Get-about" ability enables Roadster to handle a wide variety of assignments anywhere. Handles routine road maintenance . . . stockpiles gravel, coal, other bulk materials . . . works roadside pits, hauls and spreads surfacing material . . . grades driveways, building sites, airport strips . . . builds stockpond dams, handles terracing, drainage, etc.

Dozer blade . . . (optional) doubles "D's" usefulness . . . is push-button controlled by electric PCU . . . makes the "D" a handy dozer tool for back-filling, grading, light clearing, pushing other equipment, etc.

Tournapull—Trademark Reg. U.S. Pat. Off. R163-a

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